Appendix C. Hydrostatic Testing and Discharge Plan

Draft
Hydrostatic Test Plan

FERC Docket No. CP09-54-000

June 2010

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List of Abbreviations and Acronyms

BLM	U.S. Bureau of Land Management
cfs	cubic feet per second
CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
HUC	Hydrologic Unit Code
HUC-8	eight-digit fourth level hydrologic unit code
mg/L	milligrams per liter
MP	milepost
NAS	nonnative aquatic species
NBWP	Nevada Board of Water Pollution
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
Project	Ruby Pipeline Project
ROW	right-of-way
Ruby	Ruby Pipeline, LLC
UDEQ	Utah Division of Environmental Quality
UDWQ	Utah Department of Water Quality
UDWR	Utah Division of Wildlife Resources
WNV	West Nile Virus
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department

1.0 Introduction

The Ruby Pipeline Project (Project), proposed by Ruby Pipeline, LLC (Ruby), is composed of approximately 675.2 miles of 42-inch diameter natural gas pipeline, along with associated compression and measurement facilities, located between Opal, Wyoming, and Malin, Oregon. The Project would include an approximate 2.6-mile lateral to be constructed south from the Malin Hub in Klamath County, Oregon. The pipeline right-of-way (ROW) would cross four states: Wyoming, Utah, Nevada, and Oregon. Four new compressor stations would also be installed as part of the Project. Once constructed, in order to ensure compliance with U.S. Department of Transportation regulations, Ruby must pressure test this pipeline in accordance with Code of Federal Regulations (CFR) Part 192 requirements. For this project, Ruby plans to hydrostatically test the completed pipeline, using water pressurized to the appropriate level.

1.1 Agency Consultation

Ruby has consulted and continues to consult with state agencies from Wyoming, Utah, Nevada, and Oregon regarding state requirements for water withdrawal and discharge. In many cases, Ruby is consulting with agencies on a site-specific basis. A discussion of discharge permitting and monitoring requirements per each state crossed by the Project is included under Section 4.3 of this plan.

In Wyoming, the Wyoming Game and Fish Department (WGFD) and the Wyoming Department of Environmental Quality (WDEQ) recommend discharging surface waters used for hydrostatic testing to the same eight-digit fourth-level Hydrologic Unit Code (HUC) from which they were collected. This would prevent the inadvertent transfer of fish and plant diseases and invasive organisms and would prevent water collected outside the state of Wyoming from being discharged to a live drainage of the state of Wyoming.

Both WGFD and the Nevada Department of Wildlife recommend the use of temporary sediment basins in any areas where:

- The water discharge point is less than 0.5 miles from a perennial stream; and
- The water discharge point is more than 0.5 miles from a perennial stream, but the discharge flow is greater than 0.5 cubic feet per second (cfs).

The Utah Division of Wildlife Resources (UDWR) also requires the discharge of surface waters used for hydrostatic testing to the same eight-digit fourth-level HUC from which they

were collected. Specifically, UDWR has expressed concern over the potential transfer of the New Zealand Mud Snail as well as whirling disease to other HUCs. In addition to water quality monitoring requirements discussed in section 4.3 below, the Utah Department of Environmental Quality (UDEQ) requires that velocity dissipation devices are placed at point source discharge locations and along the length of the outfall channel as necessary to ensure non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected.

According to guidance received from the Oregon Department of Fish and Wildlife (ODFW), surface water intakes would be screened per ODFW guidelines, and the Project design would ensure that adequately sized screens and approach velocities are included in the water withdrawal plans. All surface water would be discharged into the same drainage basin from which it was withdrawn, to prevent the inadvertent transfer of fish/plant diseases and invasive organisms. During all proposed surface water withdrawals and waterbody construction activities, Ruby would comply with ODFW fish passage statutes (Oregon Administrative Rule [OAR] 635-412-2.0005). Ruby would maintain adequate fish passage at all Project crossings to provide passage of native migratory fish (OAR 509.610). Ruby would provide fish passage design plans for all intermittent and perennial streams crossed in Oregon. If necessary, Ruby would apply for a fish passage waiver (OAR 635-412-0025) during in-water construction activities in waterbodies that contain sensitive fish species. If water used for construction or hydrostatic testing is not obtained from municipal supplies or other water wells, Ruby would comply with OAR Water Use Authorization 690-340-0030.

2.0 Uptake

2.1 Hydrostatic Test Water Uptake Locations

The Project would withdraw water for use during hydrostatic testing at 21 separate locations, as summarized in Table 2.1-1.

A total of 280,637,619 gallons (861.25 acre-feet) of water would be used for hydrostatic testing. Of this total, 56,506,507 gallons (173.41 acre-feet) would be withdrawn from six different surface water sources, and 224,131,112 gallons (687.84 acre-feet) would be withdrawn from 15 different groundwater sources. For all surface water sources, Ruby has purchased water from upstream reservoirs or canal companies. Water would be released from these reservoirs at the time of withdrawal from the surface water source, resulting in no net loss of water at the source location. For example, water volumes withdrawn from the Ham's Fork will be associated with timed release from the Viva Naughton Reservoir. In addition, all surface water used in hydrostatic testing would be discharged within the same watershed (8-digit HUC) from which it was withdrawn. Details such as water source, manifolds (intake and potential discharge locations) and associated volumes are presented in Attachment A. Manifolds (or intake and potential discharge locations) are represented in Attachment A under the column titled "M.P. to M.P." This column indicates the beginning and end of each test section. A manifold is located at either end of each test section for potential test water discharge. Water sources, manifolds (intake and discharge locations), and HUC-8 watershed boundaries are also shown in map form in Attachment B, Figures B-1 through B-8.

Surface water intakes will be set in areas of flowing water to avoid sedimentation and the rate of extraction will assure a continued flow in the surface water source, up to 2,500 gallons per minute (5.6 cfs) and no more than 10 percent of the waterbody's base flow. Water will be drawn out with a low-pressure pump, pumping into the suction side of a high pressure pump that moves water into the pipeline. All pumps will be set into fuel/oil containment areas.

Where hydrostatic test water sources are located at some distance from the construction ROW, Ruby will lay temporary pipelines to convey water from the water source to the pipeline. Water trucks may also be used. Nine well locations identified by Ruby would require temporary hard piping to move water to the Project site for hydrostatic testing. Ruby has stated that the majority of the temporary hard piping would be laid on the ground surface private property. Locations for hard piping to the Project are as follows: Brigham City Hydrant #3 @ MP 107.40 (temporary surface line to be laid within City and Private property); Dees Inc. Well @ MP 172.66 (temporary surface line to be laid within Box Elder County Road ROW);

Walker Winecup @ MP 239.17 (temporary surface line on private property); Tabor Well @ MP 293.20 (temporary surface line on private property); Barrick Well @ MP 377.88 (temporary surface line on private property); Pine Forest Ranch Well @ MP 502.59 (temporary surface line on private property); Bud Garrett Well @ MP 617.22 (temporary surface line on private property); Eric Strum Well @ MP 0.13 on Lateral (temporary surface line on private property). Little or no surface disturbance would be required to lay water pipe on the ground, and associated impacts are expected to be negligible.

Ruby is aware, and has received numerous comments expressing concern that, appropriation of groundwater could cause detrimental effects to the area's limited water resources. Ruby is applying for temporary use of water rights for water sources. Ruby would only utilize water sources that are authorized and approved by the respective state water right permitting agencies, and Ruby would comply with any limitations or conditions on withdrawal imposed by these agencies. Any additional restrictions issued by the Federal Energy Regulatory Commission (FERC) and appropriate state agencies will be observed where water is withdrawn. Withdrawal and discharge will likely begin between August 1 and December 31, 2010.

Table 2.1-1 Water Sources for Hydrostatic Testing

Description	Milepost	State	County	Public Land Survey System Location				Projected Water Allocation for Dust Abatement		Hydrologic Unit Code
				Twp	Rge	Sec	Qtr	gallons	acre-feet	
Hams Fork River	0.98	Wyoming	Lincoln	21N	114W	28	LOT-37	15,452,371	47.42	1404010707
Bear River (Woodruff)	52.88	Utah	Rich	9N	7E	10	SE/SE	13,911,954	42.69	1601010106
Woodruff Creek	60.82	Utah	Rich	9N	6E	28	SE/SE	5,477,439	16.81	1601010107
Porcupine Canal (alternate for South Fork Little Bear River)	92.06	Utah	Cache	9N	2E	18	SW/NE	(9,059,064)	(27.80)	1601020301
South Fork Little Bear River	94.87	Utah	Cache	9N	1E	14	NE/NE	9,059,064	27.80	1601020301
Mantua Reservoir	101.38	Utah	Box Elder	9N	1W	14;15;22;23	SW;SE;E;W	1,998,143	6.13	1601020405
Brigham City Hydrant 3	107.40	Utah	Box Elder	9N	2W	12	SE/NE	2,249,295	6.90	1601020405
Central Canal	118.52	Utah	Box Elder	10N	3W	21	NE/NE	8,605,679	26.41	1601020404
Dees Inc. Well	172.66	Utah	Box Elder	12N	11W	16	SW/SW	34,274,981	105.19	1602030906
Walker Winecup	239.17	Nevada	Elko	41N	69E	6	NW/SE	19,294,450	59.21	1602030708
Tabor Ranch Well	293.20	Nevada	Elko	40N	60E	36	NE/SE	38,869,645	119.29	1604010103

Table 2.1-1 Water Sources for Hydrostatic Testing

Description	Milepost	State	County	Public Land Survey System Location				Projected Water Allocation for Dust Abatement		Hydrologic Unit Code
				Twp	Rge	Sec	Qtr	gallons	acre-feet	
Wieland Flat Compressor Station	330.00	Nevada	Elko	39N	55E	29	SE/NE	500,000	1.53	1604010202
Barrick Well	377.88	Nevada	Elko	38N	47E	5	LOT-2	18,574,438	57.00	1604010602
Christinson Well	416.00	Nevada	Humboldt	37N	42E	15	NW/NE	26,958,307	82.73	1604010908
Desert Valley Compressor Station	476.30	Nevada	Humboldt	41N	33E	9 & 10	SE/NE 9 SW/NW 10	500,000	1.53	1604020113
Pine Forest Ranch Well	502.59	Nevada	Humboldt	41N	28E	11	NW/SE	15,106,107	46.36	1604020204
Double Horseshoe Proposed Drill Well	545.76	Nevada	Washoe	42N	22E	4	SW/NE	7,903,929	24.26	1604020401
Alice Gladwill Proposed Drill Well	572.50	Nevada	Washoe	45N	19E	33	NE/NE	14,278,780	43.82	1604020403
Don Robinson Proposed Drill Well	601.90	Oregon	Lake	40S	22E	4	SE/NW	9,167,080	28.13	1712000703
Bud Garrett Well	617.22	Oregon	Lake	40 S	20E	15	LOT-6	13,340,650	40.94	1802000103

Table 2.1-1 Water Sources for Hydrostatic Testing

Description	Milepost	State	County	Public Land Survey System Location				Projected Water Allocation for Dust Abatement		Hydrologic Unit Code
				Twp	Rge	Sec	Qtr	gallons	acre-feet	
Goose Lake Timber Co. Proposed Drill Well	639.20	Oregon	Lake	41S	17E	21	NW/NW	5,510,590	16.91	1801020402
Eric Strum Well	0.13	Oregon	Klamath	41S	12E	11	SE/NE	17,602,860	54.02	1801020409

Key:
NE northeast
NW northwest
Qtr quarter
Rge range
SE southeast
Sec section
SW southwest
Twp township

2.1.1 Surface Water

Of the six proposed surface water withdrawal locations listed above, five water sources—Hams Fork River, Bear River (Woodruff), Woodruff Creek, South Fork Little Bear River, and Mantua Reservoir—potentially contain federally or state-listed sensitive fish species at or in the vicinity of the Project crossing.

Table 2.1-2 summarizes characteristics/information specific to the surface water uptake locations, including sensitive fish, non-native aquatic species, and water quality and pathogens. Summary information contained in Table 2.1-2 is described more detail in the subsections that follow.

Table 2.1-2 Proposed Surface Water Sources for Hydrostatic Test for the Ruby Pipeline Project

Milepost	Fill Source	County	State	Hydrostatic Test Water Volume (gallons)	Sensitive Fish	Sensitive Fish Species	Non-native Aquatic Species	Water Quality Issues	Water Quality Class	Potable Intake within Three Miles
0.98	Hams Fork River	Lincoln	Wyoming	15,452,371	Yes	Flannelmouth sucker, bluehead sucker, roundtail chub	Longnose dace, common carp, fathead minnow, redside shiner, Utah chub, white sucker, burbot	Not on 303(d) List	2AB [1]	No
52.88	Bear River (Woodruff)	Rich	Utah	13,911,954	Yes	Bonneville cutthroat trout, bluehead sucker, leatherside chub	Rock bass, largemouth bass, black crappie, black bullhead, channel catfish, walleye, brown trout, rainbow trout, common carp	Not on 303(d) List	2 [2]	No
60.82	Woodruff Creek	Rich	Utah	5,477,439	Yes	Bonneville cutthroat trout	Tiger trout, brown trout	Not on 303(d) List	2 [2]	Yes
92.06	Porcupine Canal (alternate for South Fork Little Bear River)	Cache	Utah	(9,059,064)	No	--	Kokanee, sockeye	Not on 303(d) List	N/A	No
94.87	South Fork Little Bear River	Cache	Utah	9,059,064	Yes	Bonneville cutthroat trout	Black bullhead catfish, channel catfish, brown trout, small mouth bass, common carp, black crappie, log perch, blue gill, green sunfish, gizzard shad, walleye, New Zealand mud snail	Not on 303(d) List	4A [3]	Yes
101.38	Mantua Reservoir	Box Elder	Utah	4,000,000	Yes	Bonneville cutthroat trout	Eurasion Water milfoil	On 303(d) List for exceedances of pH, dissolved oxygen, total phosphorus.	2B [5], 3A [4]	Yes

Table 2.1-2 Proposed Surface Water Sources for Hydrostatic Test for the Ruby Pipeline Project

Milepost	Fill Source	County	State	Hydrostatic Test Water Volume (gallons)	Sensitive Fish	Sensitive Fish Species	Non-native Aquatic Species	Water Quality Issues	Water Quality Class	Potable Intake within Three Miles
118.52	Central Canal	Box Elder	Utah	8,605,679	No	--	No NAS documented	Not on 303(d) List	N/A	No

Key:

N/A Not Available

NAS Non-native Aquatic Species

1 In Wyoming, Class 2AB waters are known to support game fish populations or spawning and nursery areas at least seasonally and where a game fishery and drinking water use are otherwise attainable. All Class 2AB waters are designated as cold-water game fisheries unless identified as a warm-water game fishery by a "ww" notation in the "Wyoming Surface Water Classification List." Unless shown otherwise, these waters are presumed to have sufficient water quality and quantity to support drinking water supplies and are protected for that use. Class 2AB waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, recreation, wildlife, industry, agriculture, and scenic value

2 In Utah, Class 2 -- Fully supporting for all assessed beneficial use classes

3 In Utah, Class 4A -- All Total Maximum Daily Loads (TMDLs) have been approved

4 In Utah, Class 3A -- Protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.

5 In Utah, Class 2B --Protected for secondary contact recreation such as boating, wading or similar uses

Sensitive Fish

The presence of sensitive fish was based on research of available literature and analysis of agency-provided geographical information system data, as well as consultation with state agencies.

In Wyoming, the Hams Fork River is likely to contain the following sensitive fish at or near the Project: flannelmouth sucker, bluehead sucker, and roundtail chub.

In Utah, the Bear River near Woodruff, is likely to contain the following sensitive fish species at or near the Project: Bonneville cutthroat trout, bluehead sucker, and Northern leatherside chub. All three of these species are listed as BLM sensitive and Utah sensitive. Woodruff Creek is also likely to contain the Bonneville cutthroat trout at or near the Project. The South Fork Little Bear River and Mantua Reservoir contain Bonneville cutthroat trout. The Porcupine Canal and Central Canal do not contain sensitive fish.

Non-Native Species

A database search of nonnative aquatic species (NAS) as well as agency consultation was conducted for all water bodies within the eight-digit fourth level hydrologic unit code (HUC-8) from which hydrostatic test water may be withdrawn. A technical memorandum describing the results of this search, as well as potential treatment options if necessary, is provided in Attachment C. NAS listed in Attachment C (and in Table 2.1-2) primarily include fish introduced to waterbodies for sport fishing and other purposes. In addition, exotic nuisance species, such as New Zealand mudsnail, Eurasian water milfoil, Brazilian water milfoil, and purple loosestrife are reported.

The presence of NAS, including nuisance species, in HUC-8 waterbodies listed in Attachment C (and in Table 2.1-2) may or may not indicate their presence in the water sources located within the same HUC-8 region. In some cases, nuisance species may be present in a portion of the water source but not necessarily at the fill location where water will be withdrawn for testing. Therefore, continued investigation of water sources will be conducted prior to hydrostatic testing, including continued consultation with agency staff at field offices located in closest proximity to the water intake location. In addition, consultation with local anglers, watershed groups, and others also may be necessary to determine if nuisance species are of concern.

Water Quality and Pathogens

As summarized in Table 2.1-2, the Mantua Reservoir in Utah is on the 303(d) List for pH, dissolved oxygen, and total phosphorus. None of the other surface water sources for hydrostatic testing are on the 303(d) List.

The presence of pathogens in test water sources, such as *Escerichia coli* (*E. coli*), was investigated through review of Section 303(d) listings. To date, pathogens are not listed as water quality issues for potential waterbody sources for which total maximum daily loads have been completed, as shown in Table 2.1-2.

Surface water sources will be sampled prior to withdrawal for use in hydrostatic testing. In addition, water will be sampled at discharge and analyzed for state required constituents, as described in Section 4.3 below.

Noxious Weeds

Ruby has surveyed for noxious weeds along the pipeline route and is developing a noxious weed plan (See Plan of Development, Appendix H). Ruby has identified areas where noxious weeds are present in the vicinity of water sources. Ruby will monitor water sources and discharge locations for the transfer of noxious weeds. If noxious weeds develop in water source or discharge areas, Ruby will treat per its noxious weed plan. .

2.1.2 Groundwater

Of the 21 proposed water sources for hydrostatic testing, 15 are groundwater (well) sources. With the exception of the USA Investments Dry Creek Crossing (Renner Reservoir) in Oregon, all water sources for hydrostatic testing in Nevada and Oregon are groundwater sources. Ruby has identified existing wells and potential new water well locations along the Project route. Ruby is in the process of acquiring temporary water rights as well as the appropriate permits necessary for drilling any new water wells to provide water for hydrostatic testing.

3.0 Testing

For hydrostatic testing, the pipeline will be filled completely in 90 to 100 separate test sections. Best Management Practices are outlined below.

If the pump head is located in the water source channel the following practices will pertain:

- The pump will not be situated in a low-flow or no-flow area as these habitats tend to concentrate larval fish;
- The amount of pumping will be limited to the greatest extent possible during that period of the year when larval fish may be present; and

During filling of the pipeline, the water intake at the location where water is being taken will be screened with ¼-inch mesh screen to prevent entrainment of fish and other large aquatic organisms from the surface water source.

Any fish impinged on the intake screen will be reported to the U.S. Fish and Wildlife Service (USFWS) at (801) 975-3330 and the appropriate state agency.

Water will likely be used for approximately three months. Discharges will occur at the locations described in Attachment A. Prior to testing, both the pipeline and welds will be inspected. In the unlikely event that there should be an accidental release due to pipeline or valve failure, the location of the release will be contained as quickly as practicable and, once the facility has been repaired and retested, the ROW will be re-contoured and reclaimed in compliance with Ruby's Reclamation Plan (Plan of Development, Appendix E).

4.0 Discharge

4.1 Hydrostatic Testing Water Discharge Locations

As described above, Ruby will test the Project in approximately 90 to 100 test sections. The number of test sections is necessitated by elevation changes, watershed boundaries, and water source availability across the Project area. Ruby is continuing to identify a sufficient number of sources of water in close proximity to the Project such that discharge of test water from surface water sources can occur within the same HUC-8 watershed from which it was withdrawn. Locations of water sources, watershed boundaries, and elevation changes are considered in locating manifolds for water uptake and discharge. For the Ham's Fork River surface water source, water will be used to test sections outside of the HUC-8 watershed from which water was withdrawn. However, in this case Ruby will bring water back to the HUC-8 from which it was withdrawn for discharge. Cascading water back across elevation changes following testing would need to be accomplished using high pressure air. Commercial air compressors cannot efficiently maintain the pressure required to move test water over large elevation changes and long distances. Further, the high pressure air has a tendency to become entrained within the discharge water, creating unpredictable and unsafe conditions (e.g. uncontrolled releases of high pressure air and water) at the discharge location.

Attachment A lists water sources, manifold locations, watershed boundaries and other pertinent information. Each row of the table included as Attachment A represents a manifold location for either water intake or discharge. For example, Test Section W-2 has a manifold location at MP 5.26 and MP 10.32. Figures B-1 through B-8 also present these features but in a map view. All discharge will take place in upland areas to adequate straw/hay bale sediment structures or temporary sediment basins (Attachment E, Energy Dissipator). Ruby will make every effort to discharge water at least 0.5 miles from perennial streams.

West Nile Virus (WNV) has been established to be a health risk to greater sage-grouse. Numerous studies have documented that sage-grouse seem to be especially susceptible to WNV but resistance is expected to increase slowly with time. Mosquitoes are the main vector for WNV. The water ponds found in oil and gas fields have been shown to increase larval mosquito habitat by 75 percent. A best management practice with regard to WNV during summer and fall months when mosquito breeding occurs is to minimize standing and slow flowing water. Standing water that cannot be eliminated within two to three days will be treated with a mosquito larvicide according to manufacturer directions.

Ruby intends to discharge surface water into the same 8-digit HUC (watershed) from which the water was withdrawn.

4.2 Treatment

Currently, Ruby intends to discharge hydrostatic test water to open ground. It may be possible at some discharge points for hydrostatic test water to migrate to nearby surface waterbodies, depending on the volume of water discharged and proximity of the surface water source. When test water is obtained from potable water sources or surface water known not to contain nuisance NAS and/or pathogens, NAS and pathogens will not be a concern and only erosion and sedimentation controls will be employed during test water discharge. When surface water containing nuisance NAS and/or pathogens is used for test water, Ruby will employ measures to prevent their discharge and subsequent migration to waterbodies known *not* to contain nuisance NAS and/or pathogens.

Most NAS, listed in Attachment D (and Table 2.1-2), that are present in source water will be prevented from entering the test water through the use of ¼-inch mesh screens at intake locations, as discussed above. For organisms smaller than ¼-inch, such as vegetation, New Zealand mudsnail, shrimp, jellyfish, and pathogens, mesh screens will not adequately prevent contamination of the test water. When nuisance NAS cannot be excluded via a screen, hydrostatic test water will be treated prior to either intake or discharge.

Of the NAS listed above, the New Zealand mud snail is likely to be of greatest concern. Mature snails reach only 1/8 to 3/16 inch in length, and juveniles are much smaller, making them difficult to screen or even detect. They are able to survive upwards of 20 days out of water at temperatures of 20–25˚ C (68–77˚ Fahrenheit), making discharge of hydrostatic test water to open ground a potential pathway for eventual migration to nearby surface water sources. Freezing and dry heating can kill these nuisance species, but these methods are impractical for treatment of large volumes of hydrostatic test water.

When test water treatment is necessary, an appropriate biocide must be selected in consultation with agency partners. Discussion of appropriate biocide and other potential treatment options is included in a technical memorandum subject “Treatment of hydrostatic test water for nuisance aquatic species,” included as Attachment D.

The impacts of discharging biocides and other potential treatment options to open ground must be investigated further prior to selection. In addition, treatment of the test water prior

to or after use must be determined. This will likely depend on the target NAS, treatment option selected, necessary treatment time, and logistics of treatment and discharge.

4.3 Discharge Permits and Monitoring

The pipe used for the Project will be new steel and lined with epoxy paint. Typically, hydrostatic test water will pick up some iron oxide (rust) from new pipeline, depending on the total time the water remains in the pipeline. The quantity is likely to be fairly small and may give the discharge water a slightly red color. The water may also pick up some sand or dirt left over from the installation. While night caps are always installed after a day's work, dirt may still find its way into the pipeline. Ruby would discharge hydrostatic test water in a manner that precludes erosion. Where the discharge point is less than 0.5 miles from a perennial stream and the flow is more than 0.5 cfs, Ruby would discharge hydrostatic test water into a temporary sediment basin or structure consisting of both hay bales and/or silt fence for sediment control. Any contaminants in the discharge water will likely be present at levels below the required minimums. To ensure this, water will be collected and tested at a certified water testing laboratory. To help avoid erosion issues, the discharge locations will be nearly level or gently rolling vegetated upland areas. Sites with restrictive drainage features (e.g., shallow depth to clay or bedrock) will be avoided.

A description of the permit and general monitoring requirements is provided in the following subsections by state crossed by the Project.

Wyoming

The Wyoming Department of Environmental Quality (WDEQ) authorizes hydrostatic testing of pipes under the General Permit to Discharge Wastewater. The General Permit for Temporary Discharges assumes the following:

- Discharged water must be relatively uncontaminated and must not have the potential to contribute non-conventional or toxic pollutant loadings to the receiving stream;
- No trans-basin transfer of surface water will be allowed, in order to prevent spreading of whirling disease spores, non-native species, and other nuisance aquatic life organisms;
- Discharges must be of short duration, lasting no longer than one year, except for discharges from the treatment of gasoline or diesel contaminated ground or surface water from leaking above/ground/underground storage tank remediation activities;

The Notice of Intent (NOI) should be submitted at least 30 days in advance of any anticipated discharge. The NOI is reviewed by the WDEQ, and a written response (or

facility certification form) is provided, indicating that the project is covered under the General Permit. The facility certification form lists effluent limitations and monitoring requirements.

At the completion of the temporary discharge, the applicant will need to provide a Notice of Termination and water analytical results. The WDEQ then terminates coverage, denies termination, or requests additional information.

General monitoring requirements for hydrostatic test water in Wyoming are provided in Table 4.3-1.

Table 4.3-1 Monitoring Requirements for Hydrostatic Test Water from Testing of Pipes, Tanks or Other Vessels in Wyoming

Parameter	Effluent Limitation	Frequency	Sample Type
Total Suspended Solids, mg/l	The concentration shall not exceed a monthly average of 30 mg/l, a weekly average of 45 mg/l or a daily maximum of 90 mg/l.	Weekly	Grab
Total Dissolved Solids, mg/l	The concentration shall not exceed 5000 mg/l unless the discharge is to the Colorado River Basin. In that case, the salt load may not exceed one ton per day or 350 tons per year.	Weekly	Grab
pH, Standard Units	The pH shall not be less than 6.5 nor more than 9.0 standard units.	Daily	Grab
Benzene, µg/l (1)	For direct discharges, the concentration shall not exceed 5 µg/l. For discharges to storm sewers, the concentration shall not exceed 50 µg/l.	Weekly	Grab
Total BETX, µg/l (1)(3)	For direct discharges, the concentration shall not exceed 100 µg/l. For discharges to storm sewers, the concentration shall not exceed 750 µg/l.	Weekly	Grab
Oil and Grease (2)	The concentration shall not exceed 10 mg/l.	Daily	Visual

Table 4.3-1 Monitoring Requirements for Hydrostatic Test Water from Testing of Pipes, Tanks or Other Vessels in Wyoming

Total Residual Chlorine, mg/l (5)	Chlorinated water must be detained before discharge until the chlorine residual reaches less than 0.05 mg/l (non-detectable).	Daily	Grab
Total Petroleum Hydrocarbons (1)(4)	The concentration shall not exceed 10 mg/l.	Weekly	Grab
Flow, gpm	Appropriate BMPs required, as listed in footnotes.[6]	Daily	Instantaneous or Continuous

Key:
BMP – Best Management Practice
gpm – gallons per minute

(1) This parameter shall be analyzed if the discharge is from hydrostatic test water from the testing of used pipes, tanks, or other similar vessels which have or may have contained petroleum products.
(2) In the event that an oil sheen or floating oil is observed in the discharge, a grab sample shall be immediately taken, analyzed, and reported. The sample shall not exceed 10 mg/l. Any noncompliance shall be reported as per as per Part II.A.2 of this permit
(3) BETX shall be measured as the sum of benzene, ethyl benzene, toluene, and xylene. EPA methods 602, 624, or 1624 shall be used for the measurement of benzene, ethyl benzene, and toluene. EPA method 8260 or an equivalent method shall be used for the measurement of xylene including ortho-, meta-, and para-xylene. (Note: Depending on Regional/State policy, EPA method 8260 may be used as a substitute or equivalent for the CWA methods 602, 624, or 1624 required under the CWA in 40 CFR Part 136.)
(4) Acceptable methods for this parameter are 1664 in the latest edition of Standard Methods for the Examination of Water and Wastewater and EPA SW846 Method 8015 (modified) for Total Purgeable Petroleum Hydrocarbons.
(5) Total residual chlorine shall be analyzed if chlorinated water is used during the hydrostatic test.
(6) If the discharge point is more than 0.5 miles from a perennial stream and the discharge flow is less than 0.5 cfs, permittee may use a series of check dams such as hay bales or straw wattles instead of a temporary sedimentation basin. If the discharge point is more than 0.5 miles from a perennial stream but the discharge flow is greater than 0.5 cfs, permittee must use a temporary sedimentation basin. If the discharge point is less than 0.5 miles from a perennial stream and discharge potentially reaches the perennial stream, permittee must use a temporary sedimentation basin. The abovementioned measures shall be modified if ineffective in preventing sedimentation or erosion.

The General Permit is set to expire on August 31, 2012.

Utah

Hydrostatic Testing discharges to groundwater in Utah can be permitted by rule, without issuance of an individual permit, if certain conditions are met. The requirements are set forth in Rule 317-6-6.2 of the Utah Administrative Code for Ground Water Quality Protection (UAC R317-6). Sufficient data will be collected to demonstrate that the discharge causes no significant detrimental affect on water resources. Water samples will be collected for laboratory analysis from each source and at each discharge location. Samples will be analyzed for oil and grease, pH, and metals. Analytical results will be provided to the Utah Department of Environmental Quality (DEQ). A written request will be prepared for submittal to the Utah DEQ that describes the project, provides maps of sources and discharge locations with nearby water features, and discusses testing and control measures. Utah DEQ will issue a determination as to whether the discharge is allowed by rule and whether any additional testing will be necessary.

Nevada

The Nevada Division of Environmental Protection, Bureau of Water Pollution (NBWP) Control issues Nevada National Pollutant Discharge Elimination System (NPDES) permits for discharges to surface water bodies and Groundwater Discharge Permits for discharges to groundwater. Hydrostatic Testing water that is discharged to the ground surface, and that does not reach surface water bodies, can be covered under a “Temporary Discharge Permit” if activities will be completed within 180 days. Monitoring requirements are developed by NBWP for each permit application. All analyses must be completed by a Nevada State Certified Lab. The application for temporary permit requires information on the proposed project, maps, anticipated quantity of discharge, proposed testing, and a $250 application fee.

Oregon

Hydrostatic Testing in Oregon will be permitted under a Water Pollution Control Facility (WPCF) individual permit. The individual permit application (WPCF-N) requires general facility and reference information as well as a list of other DEQ or public agency permits Ruby pipeline requires for agency coordination, a preliminary engineering report/facility plan, and land use compatibility statements (LUCS) from jurisdictions within which Ruby pipeline will pass. After the permit application, fee of $11,388, and LUCS are submitted to Oregon DEQ the individual permit will be drafted. The applicant will have a 14 day period to review the draft permit, after which DEQ will review and/or incorporate applicant suggested changes. There is a 35 day public notice period for the individual permit prior to issuance.

In addition to requirements of the individual permit application listed above, information additional to the hydrostatic test plan will be required. Portion A of the application will require the sub-contractor to be register with the Oregon Department of Commerce, Corporation Division. Portion F of the application will require: maps of discharge locations, schedule for development, schematic diagram of waste streams, information on groundwater sources (as they are considered drinking water), more information on surface water sources and potential pollutants, materials from which the pipeline will be constructed (includes welding materials), groundwater information at the discharge sites, and a description of surface and groundwater impacts that may occur.

5.0 References

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Attachment A Hydrostatic Testing Water Sources and Discharges

RUBY PIPELINE LLC

ATTACHMENT A - HYDROSTATIC TEST WATER SOURCE AND DISCHARGE LOCATIONS

FILL SOURCES	M. P. TO M. P. (Manifold to Manifold)	STATION TO STATION	GALLONS	MANIFOLDS	Length MILES	TWP	RNG	SEC	QTR	STATE	WATERSHED BOUNDARIES	COMMENTS
HAMS FORK @ MP. 0.98 U.S. PIPELINE - 1	**0+00 TO 39.13 FILL SECTION = 39.14 MILES**	**0+00 TO 2066+59**	**14,452,371**	**14**	**39.13**	**21**	**114W**	**28**	**SE/SE**	**WYOMING**		**Note an additional 1,000,000 galllons will be withdrawn from this source for hydrostatic testing of pipeline associated with the Roberson Compressor Station.**
TEST SECTION W-1	0+00 TO 5.26	00+00 TO278+00	**1,919,671**		**5.20**					**WYOMING**		
TEST SECTION W-2	5.26TO 10.32	278+00 TO 545+00	**1,862,521**		**5.04**					**WYOMING**		
TEST SECTION W-3	10.32 TO 19.14	545+00 TO 1011+00	**3,259,727**		**8.83**					**WYOMING**	**13.51**	
TEST SECTION W-4	19.14 TO 24.99	1011+00 TO 1319+60	**2,158,695**		**5.84**					**WYOMING**		
TEST SECTION W-5	24.99 TO 29.77	1319+60 TO 1572+00	**1,762,211**		**4.77**					**WYOMING**		
TEST SECTION W-6	29.77 TO 39.13	1572+00 TO 2066+00	**3,455,590**		**9.36**					**WYOMING**		
BEAR RIVER @ 52.88 U.S. PIPELINE - 1	**39.13 TO 76.04 FILL SECTION = 36.91 MILES**	**2066+91 TO 4014+91**	**13,911,954**	**12**	**36.91**	**9N**	**7E**	**10**	**SE/SE**	**UTAH**		
TEST SECTION W-7	39.13 TO 41.56	2066+59 TO 2194+50	**893,809**		**2.42**					**UTAH**	**40.58**	
TEST SECTION W-8	41.56 TO 48.14	2194+50 TO 2541+60	**2,430,273**		**6.58**					**UTAH**		
TEST SECTION W-9	48.14 TO 53.62	2541+60 TO 2831+21	**2,023,997**		**5.48**					**UTAH**		
TEST SECTION 10	53.62 TO 55.11	2831+21 TO 2910+07	**550,320**		**1.49**					**UTAH**		
TEST SECTION 11	55.11TO 57.52	2910+07 TO 3037+30	**890,115**		**2.41**					**UTAH**		
TEST SECTION -12	57.52 TO 61.21	3037+30 TO 3232+00	**1,362,874**		**3.69**					**UTAH**		
TEST SECTION 13	61.21 TO 66.48	3232+00 TO 3510+14	**1,946,435**		**5.27**					**UTAH**		
TEST SECTION 14	66.48 TO 69.85	3510+14 TO 3688+00	**1,244,684**		**3.37**					**UTAH**		
TEST SECTION 15	69.85 TO 73.19	3688+00 TO 3864+00	**1,233,604**		**3.34**					**UTAH**		
TEST SECTION 16	73.19 TO 76.04	3864+00 TO 4015+00	**1,052,626**		**2.85**					**UTAH**	**74.63**	
WOODRUFF CREEK @ MP. 60.82 140,551 BARRELS ASSOCIATED SPREAD- 2	**61.21 TO 76.04 FILL SECTION = 14.83 MILES**	**3211+29 TO 4055+04**	**5,477,349**	**10**	**14.83**	**9N**	**6E**	**28**	**SE/SE**	**UTAH**		
TEST SECTION 13	61.21 TO 66.48	3232+00 TO 3510+14	**1,946,435**		**5.27**					**UTAH**		
TEST SECTION 14	66.48 TO 69.85	3510+14 TO 3688+00	**1,244,684**		**3.37**					**UTAH**		
TEST SECTION 15	69.85 TO 73.19	3688+00 TO 3864+00	**1,233,604**		**3.34**					**UTAH**		
TEST SECTION 16	73.19 TO 76.04	3864+00 TO 4015+00	**1,052,626**		**2.85**					**UTAH**		
PORCUPINE CANAL @ MP 92.06			**(9,059,064)**			**9N**	**2E**	**18**	**SW/NE**	**UTAH**		**Porcupine Canal will be used as an alternate to Bear River South Fork if needed.**
BEAR RIVER SOUTH FORK @ MP. 94.87 ASSOCIATED SPREAD- 2	**76.04 TO 100.95 FILL SECTION = 24.91 MILES**	**4015+00 TO 5429+42**	~~**9,200,321**~~ **9,059,064**	**18**	**24.91**	**9N**	**2E**	**18**	**SW/NE**	**UTAH**		
TEST SECTION 17	76.04 TO 77.92	4015+00 TO 4114+40	**694,686**		**1.88**					**UTAH**		
TEST SECTION 18	77.92 TO 82.87	4114+40 TO 4375+60	**1,827,126**		**4.95**					**UTAH**		
TEST SECTION 19	82.87 TO 87.52	4375+60 TO 4621+30	**1,718,702**		**4.65**					**UTAH**		
TEST SECTION 20	87.52 TO 88.23	4621+30 TO 4658+80	**262,317**		**0.71**					**UTAH**		
TEST SECTION 21	88.23 TO 90.96	4658+80 TO 4803+00	**1,008,697**		**2.73**					**UTAH**		
TEST SECTION 22	90.96 TO 92.12	4803+00 TO 4864+41	**429,570**		**1.16**					**UTAH**		

FILL SOURCES	M. P. TO M. P. (Manifold to Manifold)	STATION TO STATION	GALLONS	MANIFOLDS	Length MILES	TWP	RNG	SEC	QTR	STATE	WATERSHED BOUNDARIES	COMMENTS
TEST SECTION 23	92.12 TO 99.03	4864+41 TO 5229+00	2,550,352		6.91					UTAH		
TEST SECTION 24	99.03 TO 100.95	5229+00 TO 5330+16	709,138		1.92					UTAH		
BRIGHAM CITY HYDRANT @ MP. 107.4	100.95 TO 112.38 FILL SECTION = 11.5 MILES	5330+16 TO 5934+72	~~4,247,438~~ 2,249,295	12	11.50	9N	2W	12	SE/NE	UTAH		
TEST SECTION 24 A	100.95 TO 102.83	5330+16 TO 5429+50	694,364		1.88					UTAH	101.02	
TEST SECTION 25	102.83 TO 103.78	5429+20 TO 5479+83	838,407		2.27					UTAH		
TEST SECTION 25 A	103.78 TO 105.04	5479+83 TO 5546+00	465,372		1.26					UTAH		
TEST SECTION 26	105.04 TO 109.24	5546+00 TO 5767+94	1,447,822		3.92					UTAH		
TEST SECTION 27	109.24 TO 112.38	5767+94 TO 5933+50	1,159,735		3.14					UTAH		
Mantua Reservoir @ M.P. 101.38	100.95 TO 105.04 FILL SECTION = 4.09 MILES	5330+16 TO 5352+96	~~1998143~~ 4,000,000		4.09	9N	1W	14; 15; 22; 23	SW; SE; E; W	UTAH		
TEST SECTION 24 A	100.95 TO 102.83	5330+16 TO 5429+50	694,364		1.88					UTAH	101.02	
TEST SECTION 25	102.83 TO 103.78	5429+20 TO 5479+83	838,407		2.27					UTAH		
TEST SECTION 25 A	103.78 TO 105.04	5479+83 TO 5546+00	465,372		1.26					UTAH		
Central Canal @ MP 118.52 US PIPELINE -1B	112.38 TO 135.70 FILL SECTION = 23.30 MILES	5933+50 TO 7164+80	8,605,679	6	23.30	10N	2W	29	LOT-5	UTAH		
TEST SECTION 27 A	112.38 TO 128.66	5933+50TO 6793+00	6,012,895		16.28					UTAH		
TEST SECTION 28	128.66 TO 135.70	6793+00 TO 7164+80	2,600,171		7.04					UTAH	133.51	
Dee's Inc. Well @ MP . 172.66 US PIPELINE - 1B US PIPELINE- 3	135.70 TO 228.50 FILL SECTION = 92.80 MILES	7164+80 TO 12064+60	34,274,981	28	92.80	12N	11W	16	LOT-5	UTAH		Note an additional 500,000 galllons will be withdrawn from this source for hydrostatic testing of pipeline associated with the Wildcat Hills Compressor Station.
TEST SECTION 29	135.7 TO 140.44	7164+80 TO 7415+00	1,750,683		4.74					UTAH		
TEST SECTION 30	140.44 TO 144.63	7415+00 TO 7636+50	1,551,238		4.20					UTAH		
TEST SECTION 31	144.63 TO 147.27	7636+50 TO 7775+87	975,064		2.64					UTAH		
TEST SECTION 32	147.27 TO 154.72	7775+87 TO 8169+00	2,751,601		7.45					UTAH		
TEST SECTION 33	154.72 TO 159.02	8169+00 TO 8396+50	1,591,866		4.31					UTAH		
TEST SECTION 34	159.02 TO 177.41	8396+50 TO 9367+00	6,788,515		18.38					UTAH	167.43	
TEST SECTION 35	177.41 TO 186.00	9367+00 TO 9821+00	3,176,345		8.60					UTAH		
TEST SECTION 36	186.00 TO 197.25	9821+00 TO 10415+00	4,155,103		11.25					UTAH		
TEST SECTION 37	197.25 TO 204.26	10415+00 TO 10785+00	2,589,091		7.01					UTAH		
TEST SECTION 38	204.26 TO 207.73	10785+00 TO 10968+00	2,256,682		6.11					UTAH		
TEST SECTION 39	207.73 TO 214.41	10968+00 TO 11321+00	2,470,901		6.69					UTAH		
TEST SECTION 40	214.41 TO 223.54	11321+00 TO 11803+00	3,420,111		9.26					UTAH		
TEST SECTION 41	223.54 TO 228.50	11803+00 TO 12064+60	1,828,245		4.95					UTAH		
WALKER WINECUP WELL @ MP. 239.17 US PIPELINE- 2	228.50 TO 280.74 FILL SECTION= 52.24 MILES	12064+60 TO 14823+00	19,294,450	16	52.24	42N	68E	35	SE/SE	NEVADA		
TEST SECTION 42	228.5 TO 230.99	12064+60 TO 12196+30	919,663		2.49					NEVADA		
TEST SECTION 43	230.99 TO 235.40	12196+30 TO 12429+00	1,628,800		4.41					NEVADA	233.82	
TEST SECTION 44	235.4 TO 241.28	12429+00 TO 12739+32	2,171,734		5.88					NEVADA		
TEST SECTION 45	241.28 TO 250.36	12739+32 TO 13219+00	3,353,630		9.08					NEVADA		
TEST SECTION 46	250.36 TO 260.61	13219+00 TO 13760+00	3,785,760		10.25					NEVADA		

FILL SOURCES	M. P. TO M. P. (Manifold to Manifold)	STATION TO STATION	GALLONS	MANIFOLDS	Length MILES	TWP	RNG	SEC	QTR	STATE	WATERSHED BOUNDARIES	COMMENTS
TEST SECTION 47	260.61 TO 269.17	13760+00 TO 14212+00	**3,161,572**		**8.56**					**NEVADA**		
TEST SECTION 48	269.17 TO 275.95	14212+00 TO 14570+00	**2,504,142**		**6.78**					**NEVADA**		
TEST SECTION 49	275.95 TO 280.74	14570+00 TO 14823+00	**1,769,150**		**4.79**					**NEVADA**		
TABOR RANCH WELL @ MP. 293.20 US. PIPELINE- SPREAD 4A PRECISION- SPREAD 1	**280.74 TO 364.32 FILL SECTION = 83.58 MILES**	**14823+00 TO 19236+00**	**38,869,645**	**6**	**83.58**	**39N**	**60E**	**11**	**SW/NE**	**NEVADA**		
TEST SECTION 50	280.74 TO 283.93	14823+00 TO 14991+29	**1,178,202**		**3.19**					**NEVADA**		
TEST SECTION 51	283.93 TO 292.75	14991+29 TO 15457+20	**3,257,601**		**8.82**					**NEVADA**		
TEST SECTION 52	292.75 TO 303.64	15457+20 TO 16032+00	**3,748,826**	**6**	**10.15**					**NEVADA**		
TEST SECTION 53	303.64 TO 307.65	16032+00 TO 16244+00	**1,484,757**		**4.02**					**NEVADA**		
TEST SECTION 54	307.65 TO 315.70	16244+00 TO 16669+00	**2,973,207**		**8.05**					**NEVADA**	**309.34**	
TEST SECTION 55	315.7 TO 323.45	16669+00 TO 17078+00	**2,862,404**		**7.75**					**NEVADA**		
TEST SECTION 56	323.45 TO 330.45	17078+00 TO 17445+00	**2,566,930**		**6.95**					**NEVADA**		
TEST SECTION 57	330.45 TO 339.04	17445+00 TO 17901+50	**3,216,973**		**8.71**					**NEVADA**		
TEST SECTION 58	339.04 TO 346.52	17901+50 TO 18296+40	**2,762,682**		**7.48**					**NEVADA**	**341.72**	
TEST SECTION 59	346.52 TO 349.36	18296+40 TO 18446+00	**1,045,239**		**2.83**					**NEVADA**	**347.75**	
TEST SECTION 60	349.36 TO 351.99	18446+00 TO 18585+00	**971,371**		**2.63**					**NEVADA**		
TEST SECTION 61	351.99 TO 357.65	18585+00 TO 18884+00	**2,090,478**		**5.66**					**NEVADA**	**357.15**	
TEST SECTION 62	357.65 TO 364.32	18884+00 TO 19236+00	**2,463,514**	**22**	**6.67**					**NEVADA**		
BARRICK MINING WELL @ MP. 377.80 PRECISION- SPREAD 5&4B	**364.32 TO 414.61 FILL SECTION = 50.29 MILES**	**18296+40 TO 21891+50**	**18,574,438**	**12**	**50.29**	**39N**	**48E**	**34**	**NE/NE**	**NEVADA**		
TEST SECTION 63	364.32 TO 373.98	19236+00 TO 19746+00	**3,567,848**		**9.66**					**NEVADA**		
TEST SECTION 64	373.98 TO 381.91	19746+00 TO 20165+00	**2,932,579**		**7.94**					**NEVADA**		
TEST SECTION 65	381.91 TO 391.48	20165+00 TO 20670+00	**3,530,914**		**9.56**					**NEVADA**	**387.55**	
TEST SECTION 66	391.48 TO 401.93	20670+00 TO 21222+00	**3,859,629**		**10.45**					**NEVADA**		
TEST SECTION 67	401.93 TO 414.61	21222+00 TO 21891+50	**4,786,678**		**12.96**					**NEVADA**		
CHRISTINSON WELL @ MP. 416.00 PRECISION- SPREAD 5	**414.61 TO 487.60 FILL SECTION = 72.99 MILES**	**23037+69 TO 26949+12**	**26,958,307**	**10**	**72.99**	**39N**	**38E**	**25**	**NE/NE**	**NEVADA**		
TEST SECTION 68	414.61 TO 420.14	21891+50 TO 22183+50	**2,042,464**		**5.53**					**NEVADA**	**417.19**	
TEST SECTION 69	420.14 TO 438.82	22183+50 TO 23169+50	**6,895,624**		**18.67**					**NEVADA**	**423.63**	
TEST SECTION 70	438.82 TO 451.29	23169+50 TO 23828+00	**4,605,701**		**12.47**					**NEVADA**	**444.38**	
TEST SECTION 71	451.29 TO 487.60	23828+00 TO 25745+46	**13,469,920**		**36.47**					**NEVADA**		
PINE FOREST LAND WELL @ MP. 502.59 PRECISION- SPREAD 4B	**487.60 TO 528.14 FILL SECTION = 40.90 MILES**	**26505+60 TO 27904+80**	**15,106,107**	**14**	**40.90**	**41N**	**28E**	**12**	**SW/NW**	**NEVADA**		
TEST SECTION 72	487.6 TO 505.97	25745+46 TO 26715+00	**6,777,434**		**18.35**					**NEVADA**		
TEST SECTION 73	505.97 TO 509.79	26715+00 TO 26917+00	**1,414,582**		**3.83**					**NEVADA**	**509.14**	
TEST SECTION 74	509.79 TO 512.92	26917+00 TO 27082+00	**1,152,348**		**3.12**					**NEVADA**		
TEST SECTION 75	512.92 TO 514.27	27082+00 TO 27153+35	**498,612**		**1.35**					**NEVADA**		
TEST SECTION 76	514.27 TO 519.79	27153+35 TO 27445+00	**2,038,770**		**5.52**					**NEVADA**	**519.62**	
TEST SECTION 77	519.79 TO 528.14	27445+00 TO 27885+60	**3,080,316**		**8.34**					**NEVADA**	**519.62/520.17/525.65**	
DOUBLE HORSESHOE RANCH,LLC - IRRIGATION STREAM @ M.P. 545.76	**528.14 TO 549.91 FILL SECTION = 21.40 MILES**	**27904+80 TO 29034=72**	**7,903,929**	**10**	**21.40**	**42N**	**22E**	**17**	**NW/SE**	**NEVADA**		
TEST SECTION 78	528.14 TO 532.47	27885+60 TO 28114+50	**1,602,946**		**4.34**					**NEVADA**	**530.65**	

FILL SOURCES	M. P. TO M. P. (Manifold to Manifold)	STATION TO STATION	GALLONS	MANIFOLDS	Length MILES	TWP	RNG	SEC	QTR	STATE	WATERSHED BOUNDARIES	COMMENTS
TEST SECTION 79	532.47 TO 538.91	28114+50 TO 28454+45	**2,378,565**		**6.44**					**NEVADA**		
TEST SECTION 80	538.91 TO 542.65	28454+45 TO 28652+00	**1,403,501**		**3.80**					**NEVADA**		
TEST SECTION 81	542.65 TO 549.91	28652+00 TO 29035+00	**2,677,733**		**7.25**					**NEVADA**	**542.9**	
ALICE GLADWILL DRILL WELL @ MP. 572.50 PRECISION- SPREAD 4B ROCKFORD- SPREAD 6A	**549.91 TO 588.56 FILL SECTION = 38.66 MILES**	**29034+72 TO 31076+00**	**14,278,780**	**8**	**38.66**	**45N**	**19E**	**21**	**SW/NE**	**NEVADA**		
TEST SECTION 82	549.91 TO 572.55	29035+00 TO 30230+75	**8,365,607**		**22.65**					**NEVADA**		
TEST SECTION 83	572.55 TO 581.91	30230+75 TO 30725+00	**3,457,045**		**9.36**					**NEVADA**	**575.28**	
TEST SECTION 84	581.91 TO 588.56	30725+00 TO 31076+00	**2,456,127**		**6.65**					**NEVADA**		
DON ROBINSON Drill well @ MP. ~~602~~ 601.9 ROCKFORD- SPREAD 6B	**588.56 TO 613.38 FILL SECTION = 24.82 MILES**	**31076+00 TO 32386+67**	**9,167,080**	**8**	**24.82**	**45N**	**22E**	**4**	**SW/NE**	**OREGON**		
TEST SECTION 85	588.56 TO 595.87	31076+00 TO 31462+00	**2,699,893**		**7.31**					**OREGON**		
TEST SECTION 86	595.87 TO 601.79	31462+00 TO 31744+60	**2,186,507**		**5.92**					**OREGON**		
TEST SECTION 87	601.79 TO 609.94	31744+60 TO 32204+80	**3,010,141**		**8.15**					**OREGON**	**609.81**	
TEST SECTION 88	609.94 TO 613.38	32204+80 TO 32386+67	**1,270,538**		**3.44**					**OREGON**		
BUD GARRETT WELL @ M.P. 617.22 ROCKFORD SPREAD-7&6B	**613.38 TO 634.58 FILL SECTION = 21.20 MILES**	**32386+67 TO 33506+00**	**~~7,830,060~~ 13,340,650**	**8**	**21.20**	**40S**	**20E**	**2**	**NE/SE**	**OREGON**		
TEST SECTION 89	613.38 TO 614.24	32386+67 TO 32432+00	**317,635**		**0.86**					**OREGON**		
TEST SECTION 90	614.24 TO 629.58	32432+00 TO 33242+00	**5,809,757**		**15.73**					**OREGON**		
TEST SECTION 91	629.58 TO 634.58	33242+00 TO 33506+00	**1,846,712**		**5.00**					**OREGON**		
GOOSE LAKE TIMBER DRILL WELL @ MP. 639.2 ROCKFORD- SPREAD 7 DRILL WELL	**634.58 TO 649.53 FILL SECTION = 14.92 MILES**	**33506+00 TO 34295+00**	**5,510,590**	**6**	**14.92**	**41S**	**18E**	**13**	**SW/NE**	**OREGON**		
TEST SECTION 92	634.58 TO 643.11	33506+00 TO 33956+00	**3,146,798**		**8.52**					**OREGON**	**638.15**	
TEST SECTION 93	643.11 TO 649.53	33956+00 TO 34295+00	**2,371,179**		**6.42**					**OREGON**		
TEST SECTION 94	649.53 TO 666.27	34295+00 TO 35179+00	**6,182,793**		**16.74**					**OREGON**		
TEST SECTION 95	666.27 TO 670.80	35179+00 TO 35418+20	**1,462,596**		**3.96**					**OREGON**		
TEST SECTION 96	670.8 TO 672.62	35418+20 TO 35514+20	**672,203**		**1.82**					**OREGON**		
ERIC STRUM WELL @ MP. 0.13 ROCKFORD- SPREAD 7	**0.00 TO 2.62 = 2.61 MILES 645.59 TO 676.26 =13.50 MILES**	**0.00 TO 137+80 35706+52 TO 34993+72**	**17,602,860**	**10**	**2.62**	**41S**	**14E**	**3**	**LOT-3**	**OREGON**		
TEST SECTION 94	649.53 TO 666.27	34295+00 TO 35179+00	**6,182,793**		**16.74**					**OREGON**		
TEST SECTION 95	666.27 TO 670.80	35179+00 TO 35418+20	**1,462,596**		**3.96**					**OREGON**		
TEST SECTION 96	670.8 TO 672.62	35418+20 TO 35514+20	**672,203**		**1.82**					**OREGON**		
TEST SECTION LATERAL	0.00 TO 2.62	0+00 TO 138+33	**967,677**		**2.62**					**OREGON**		
					677.26							

NOTE: DISCHARGE QUANTITIES ARE BASED ON TEST SECTION LENGTH; MULTIPLE TEST SECTIONS MAY BE DISCHARGED AT A SINGLE LOCATION. Surface water will be discharged back into the 8 digit water basin.

Attachment B Maps of Potential Water Sources and Discharge Locations

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Franklin Co.
Bear Lake Co.
Idaho
Utah
Wyoming
Bear Lake
Beaver Creek
Logan River
89
Cache Co.
Little Bear-Logan 16010203
Cottonwood Canyon
Laketown Canyon
Otter Creek
Beckwith and Quinn Canal
Rich Co.
Upper Bear 16010101
Bear River
Rock Creek
Twin Creek
Hams Fork
Slate Creek
Kemmerer
Lincoln Co.
Green River
Fourmile Gulch
Big Sandy River
Shute Creek
Sevenmile Wash
Sevenmile Gulch
Blacks Fork
Blacks Fork 14040107
Dry Muddy Creek
Little Muddy Creek
Sweetwater Co.
Meadow Springs Wash
Muddy 14040108
Uinta Co.
Muddy Creek
Albert Creek
Blacks Fork Canal
Smiths Fork
Little Dry Creek
Big Dry Creek
80
30
189
Big Creek
Blacksmith Fork
Woodruff Creek
Saleratus Creek
Dry Creek
Wyoming
Utah
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
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20
30
40
50
60
70
80

OR
ID
WY
CA
NV
UT

Proposed Pipeline

Potential Discharge Locations
- Test Manifold (Manifold # labeled)

Potential Water Sources
- Hydrostatic Test
- Hydrostatic & Dust Abatement
- Permanent Use, Hydrostatic Test & Dust Abatement

- Stream
- Stream Intermittent
- Canal
- Lake; Reservoir
- Lake Intermittent
- Lake Dry
- Swamp or Marsh
- Hydrologic Unit Code
- Interstate
- Highway
- State
- County

0 5 10 20 30 Miles

N

Figure B-1

Potential Water Sources and Discharge Locations

Wyoming

Ruby Pipeline Project

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Lower Bear-Malad 16010204
Curlew Valley 16020309
Box Elder Co.
Cache Co.
Little Bear-Logan 16010203
Rich Co.
Wyoming
Utah
Lincoln Co.
Muddy 14040108
Upper Bear 16010101
Uinta Co.
Weber Co.
Morgan Co.
Great Salt Lake
Bear Lake
Blue Creek
Clarkston Creek
Cub River
Bear River
Newton Creek
West Canal
Malad River
Little Bear River
Logan River
Blacksmith Fork
Cottonwood Canyon
Laketown Canyon
Otter Creek
Beckwith and Quinn Canal
Twin Creek
Rock Creek
Big Creek
Dry Creek
Woodruff Creek
Saleratus Creek
Stacey Hollow
McKay Hollow
Lost Creek
Left Fork South Fork Ogden River
Middle Fork Ogden River
South Fork Ogden River
Ogden River
Weber River
Yellow Creek
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
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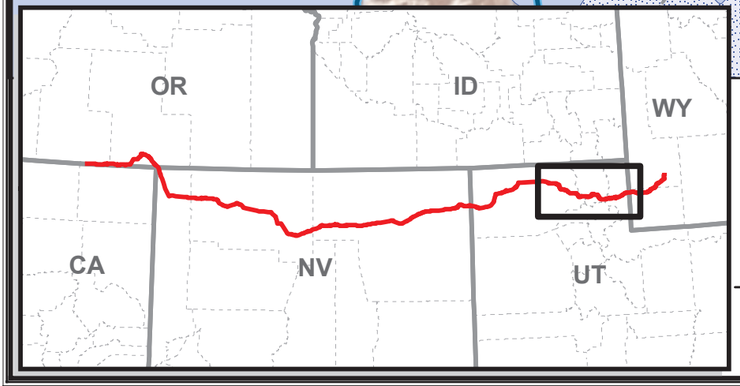
130
140
150
84
15
89
91
30
80



Proposed Pipeline

Potential Discharge Locations
- Test Manifold (Manifold # labeled)

Potential Water Sources
- Hydrostatic Test
- Hydrostatic & Dust Abatement
- Permanent Use, Hydrostatic Test & Dust Abatement

Stream
Stream Intermittent
Canal
Lake; Reservoir
Lake Intermittent
Lake Dry
Swamp or Marsh
Hydrologic Unit Code

Interstate
Highway
State
County

0 5 10 20 30 Miles

N

Figure B-2

Potential Water Sources and Discharge Locations

Utah

Ruby Pipeline Project

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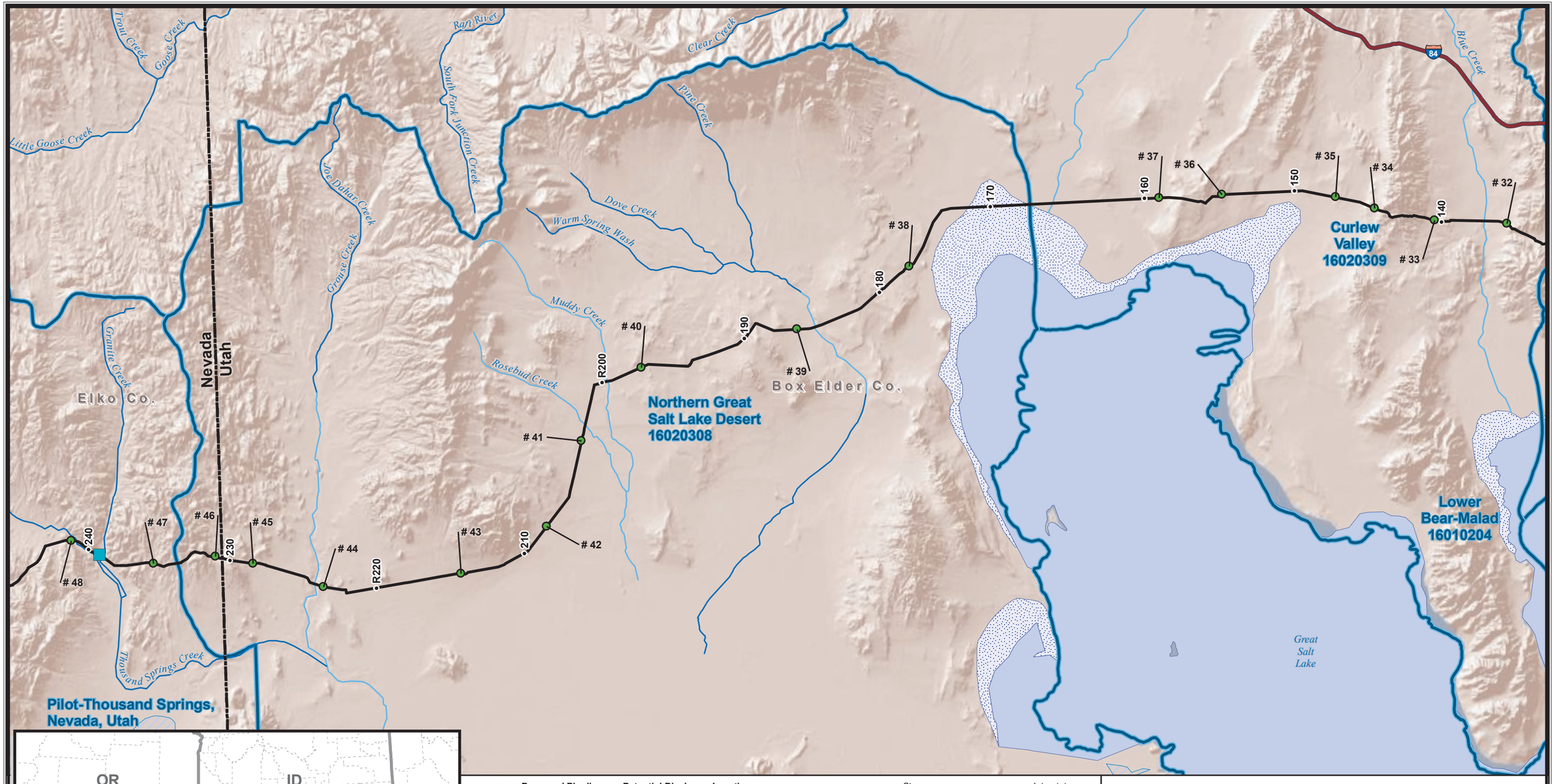

Figure B-3

Potential Water Sources and Discharge Locations

Utah

Ruby Pipeline Project

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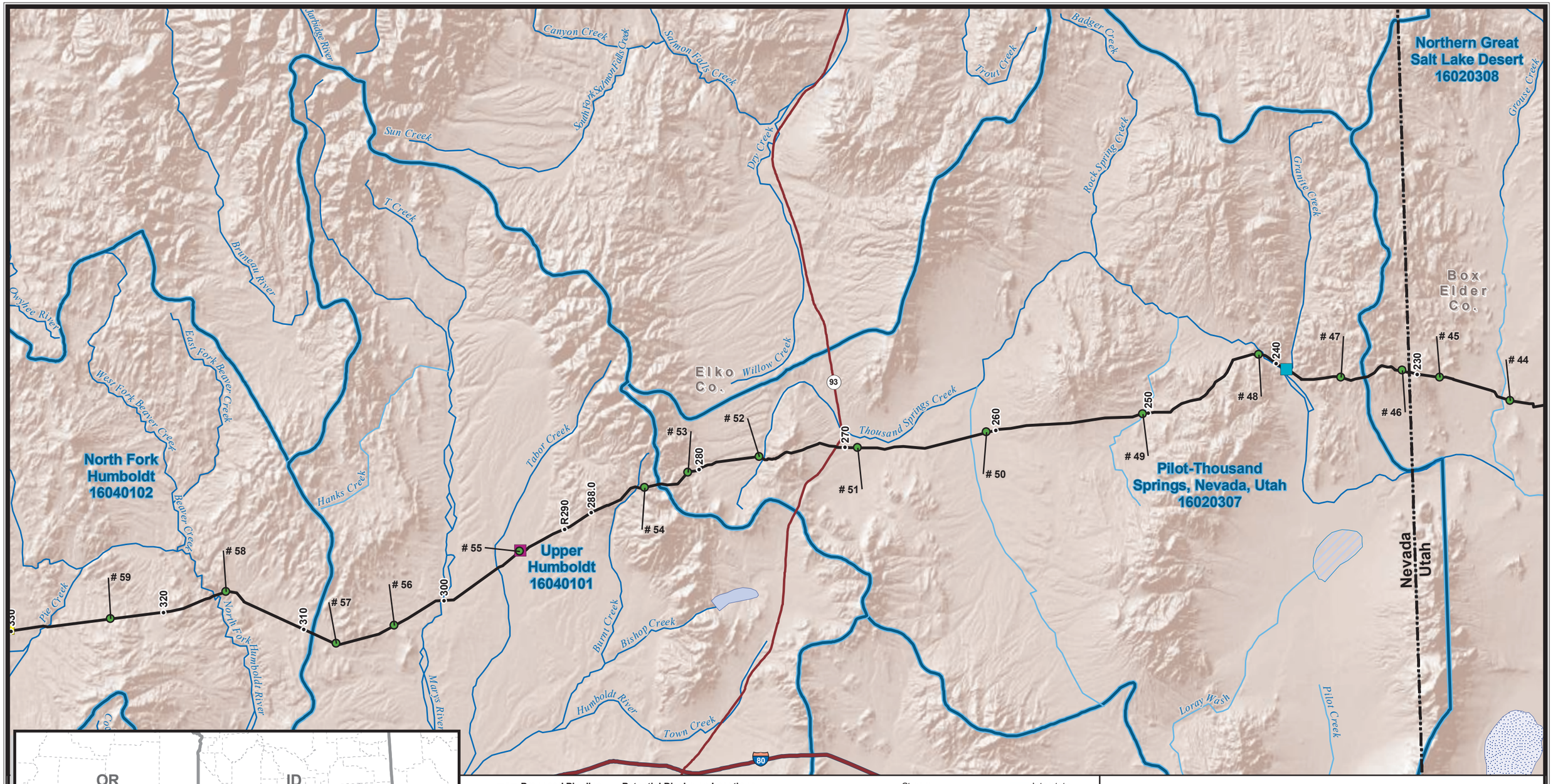

Figure B-4

Potential Water Sources and Discharge Locations

Nevada

Ruby Pipeline Project

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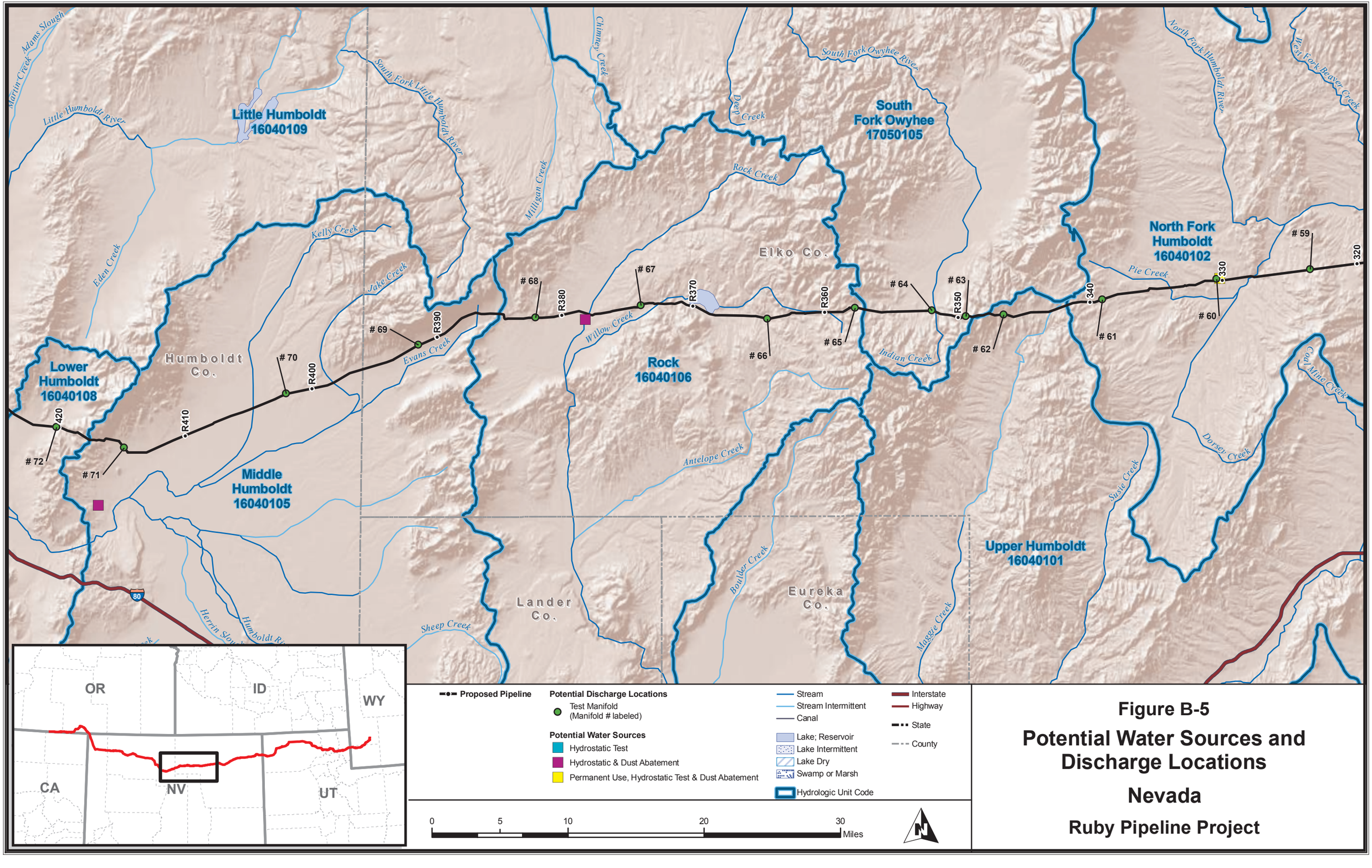

Figure B-5

Potential Water Sources and Discharge Locations

Nevada

Ruby Pipeline Project

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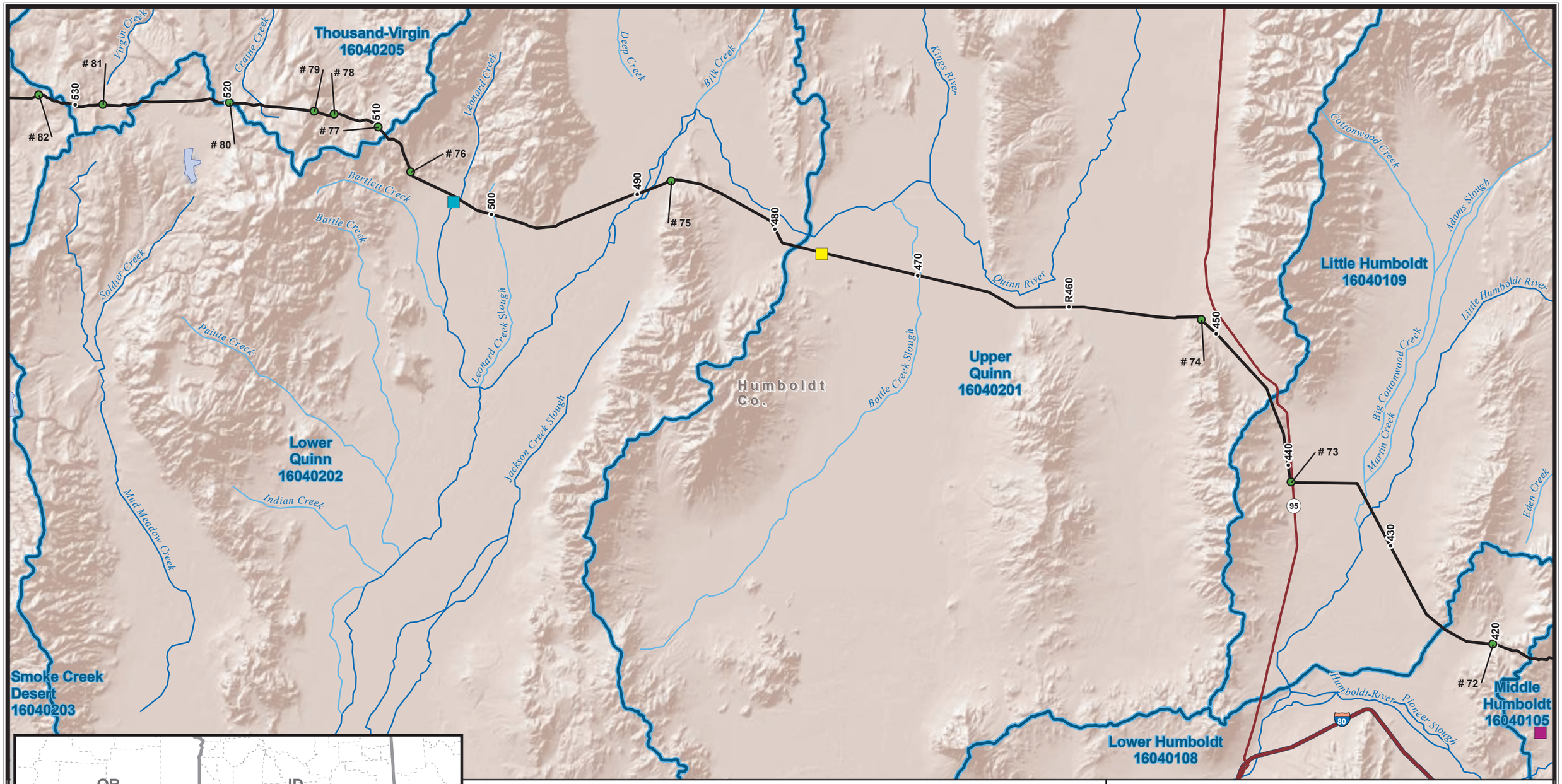

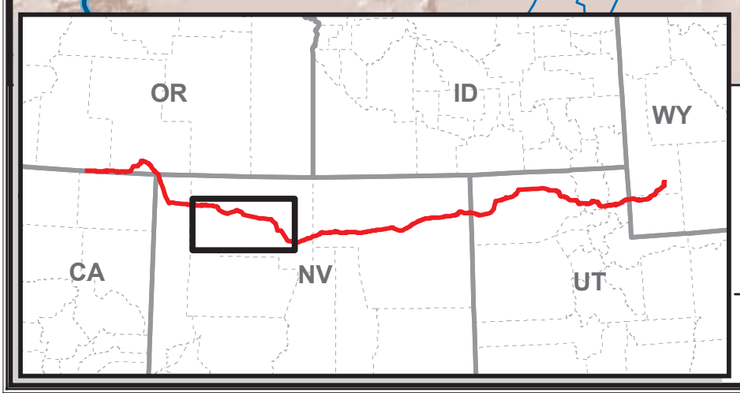

Proposed Pipeline

Potential Discharge Locations
- Test Manifold (Manifold # labeled)

Potential Water Sources
- Hydrostatic Test
- Hydrostatic & Dust Abatement
- Permanent Use, Hydrostatic Test & Dust Abatement

- Stream
- Stream Intermittent
- Canal
- Lake; Reservoir
- Lake Intermittent
- Lake Dry
- Swamp or Marsh
- Hydrologic Unit Code
- Interstate
- Highway
- State
- County

0 5 10 20 30 Miles

N

Figure B-6

Potential Water Sources and Discharge Locations

Nevada

Ruby Pipeline Project

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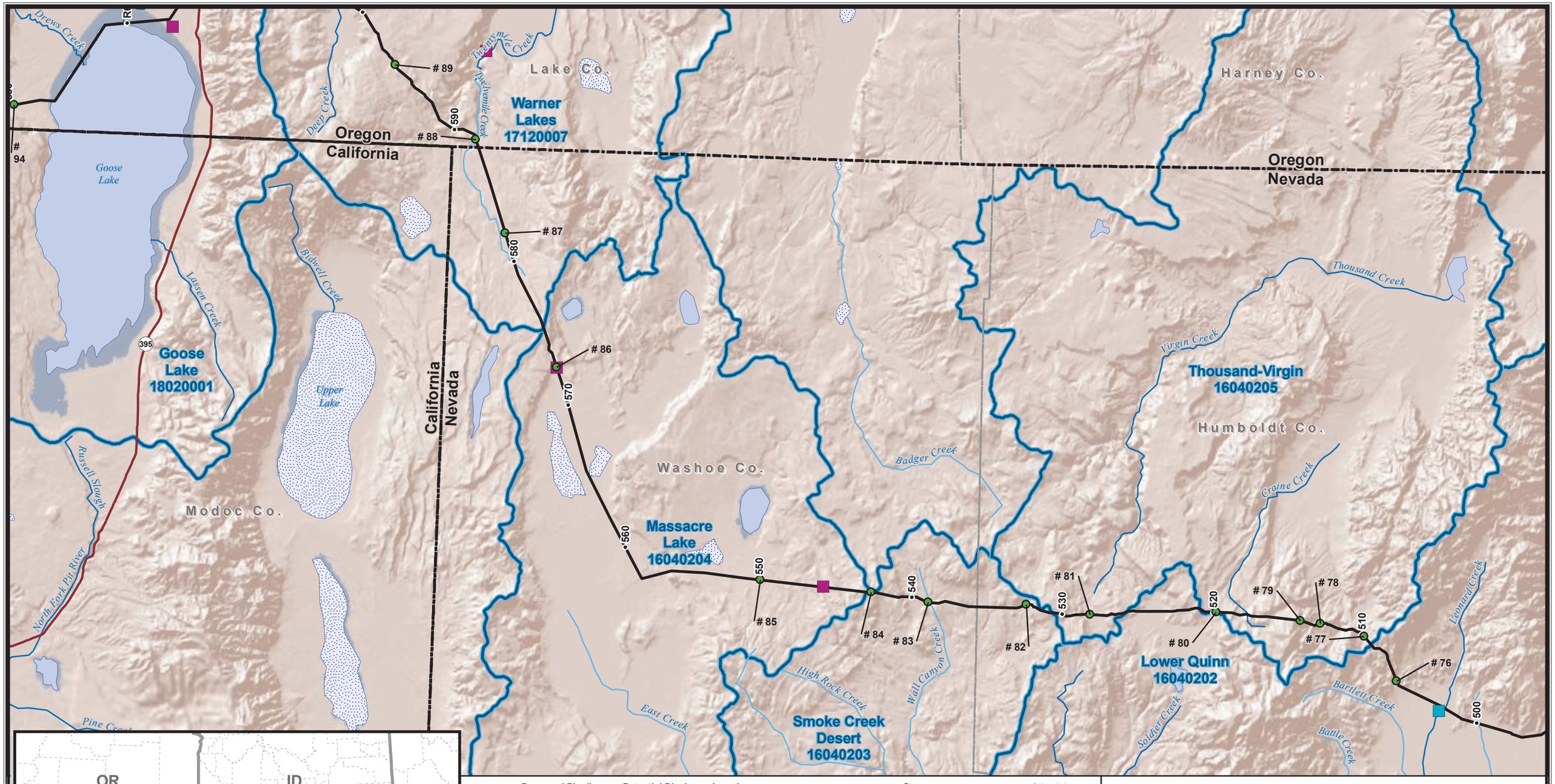

Figure B-7

Potential Water Sources and Discharge Locations

Nevada

Ruby Pipeline Project

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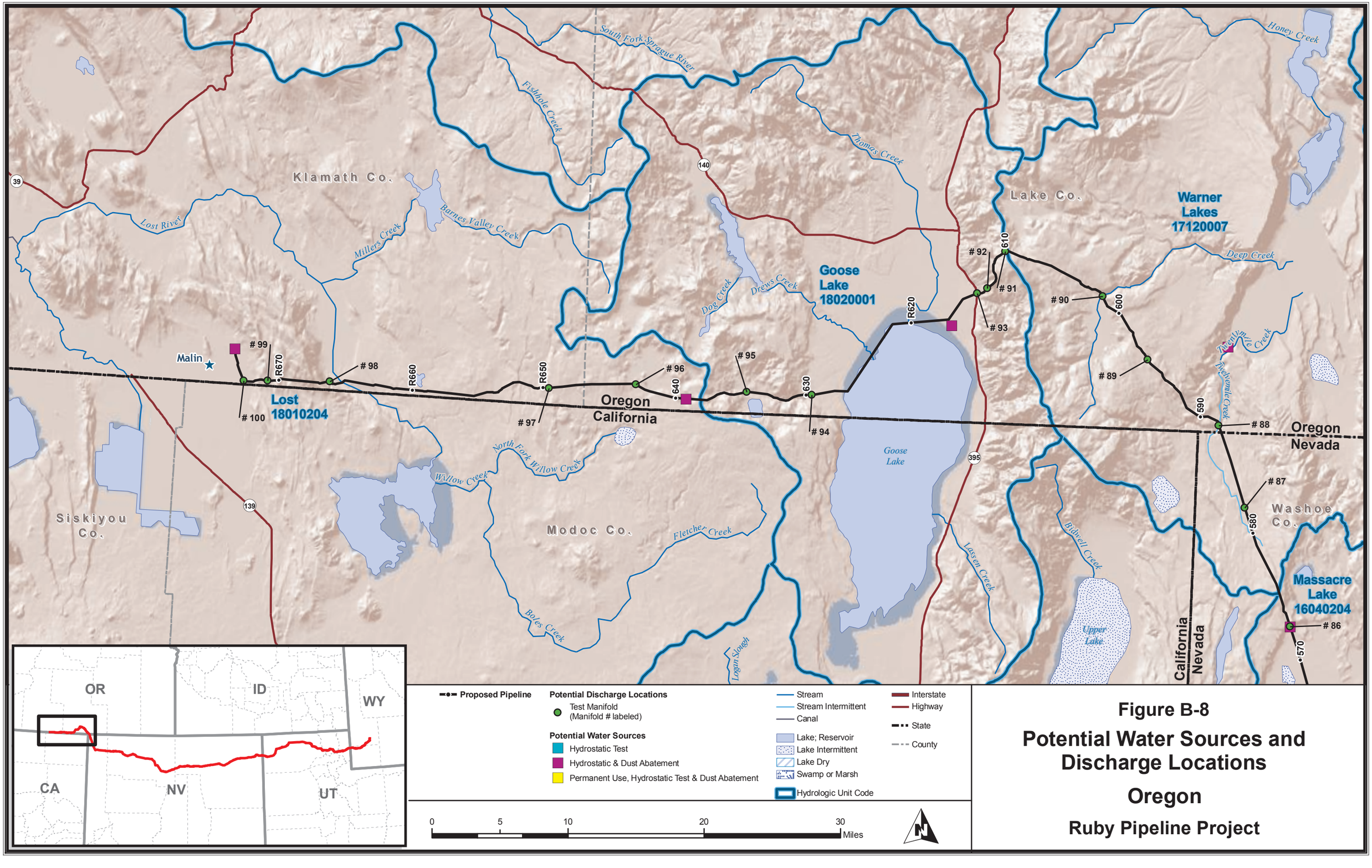


Figure B-8

Potential Water Sources and Discharge Locations

Oregon

Ruby Pipeline Project

Attachment C Technical Memorandum: Evaluation and Treatment of Hydrostatic Test Water for Non-Indigenous Aquatic Species

TECHNICAL MEMORANDUM

To: Erin Lynch, Ecology and Environment, Inc. (E & E) – Portland
From: Alma Feldpausch, E & E – Seattle
Natalie Seitz, E & E – Seattle
Cc: Noreen Roster, E & E – Portland
Jim Thornton, E & E – Portland
Date: May 26, 2009
Subject: Evaluation and treatment of hydrostatic test water for non-indigenous aquatic species (updated February 9, 2010)

Background

Use of surface water in hydrostatic pipeline testing will be conducted by Ruby Pipeline, LLC. for the Project. Discharge of surface water to any drainage other than the source drainage (defined by Hydrologic Unit Code or HUC-8; watershed scale) has raised concerns among state fish and wildlife agencies due to the potential to transfer non-indigenous aquatic species (NAS)1 between drainages. Of particular concern are aquatic nuisance species (ANS)2 that, if transferred to a new drainage, may negatively impact the aquatic environment. State fish and wildlife agencies request treatment of hydrostatic test water to eliminate the presence of NAS prior to discharge.

There is no industry standard for treatment of hydrostatic test water for NAS, nor do resource and water quality agencies provide recommendations for treatment of NAS present in hydrostatic test water.

This memorandum provides a summary of issues pertaining to NAS in hydrostatic test water and recommends two water treatment options, use of biocide GreenClean manufactured by BioSafe Systems Inc. or the use of pressurized carbon dioxide.

Are NAS present in test water sources?

A search of the U.S. Geological Survey's (USGS) comprehensive NAS database was performed to determine if NAS are known to be present in proposed hydrostatic test water sources (see Attachment 1). The USGS NAS database indicates that domestic NAS are present in the Ham's

1 NAS are defined as a species that enters a water body or aquatic ecosystem outside of its historic or native range. This can include exotics, or species originating outside North America, as well as species native to North America that have been introduced to drainages outside their native ranges.

2 ANS are NAS that produce harmful impacts on aquatic natural resources and harm human use of these resources.

Fork Creek, Wyoming (longnose dace), Mantua Reservoir, UT (bluegill), and Bear River, Utah (walleye, American shad, bass, crappie, bullhead, catfish) (USGS 2004). It is not known if the NAS are present at the point of test water uptake. No exotic species are reported to be present in these water bodies in the general vicinity of the pipeline though the USGS NAS database indicates that an exotic species, the New Zealand mud snail (NZMS), has been reported in the Little Bear River, Utah at Avon.

To confirm the presence or absence of NAS, E & E contacted state fish and wildlife agency representatives familiar with water bodies along the route of the pipeline (see Attachment 2). The majority of test water uptake locations have not been surveyed specifically for NAS.

If NAS are present in test water sources, what can be done to avoid or reduce uptake into the pipeline?

Screening at the point of water intake will prevent uptake of NAS larger than 0.25 inch. However, NAS such as the NZMS are too small to screen effectively. The full-grown NZMS, for example, is only 5 mm or 0.2 inches. Because several exotic species noted above (NZMS, Asian clam, quagga mussel, zebra mussel) are benthic organisms, uptake can be dramatically reduced by ensuring that the pump head is placed at the water surface or within the water column, rather than resting on the river or lake bottom. Also, populations of NAS tend to decrease during the winter, when temperatures drop and waters freeze. Uptake of water immediately after the spring thaw, following a winter freeze, will decrease the likelihood that NAS are taken up into the test water.

Is water treatment necessary if test water is discharged to upland areas?

If NAS are present in test water that is discharged to upland areas, treatment to eradicate NAS may not be necessary. Test water allowed to infiltrate soils and evaporate will result in desiccation and death of NAS. Discharging water during freezing temperatures and allowing for discharged water to freeze for at least four hours will result in death of NZMS (Hylleberg and Siegismund 1987, Siegismund and Hylleberg 1987). Discharge of water to upland areas under hot, low-humidity conditions (> 80 degrees F for 24 hours) also will result in more rapid death of NAS such as NZMS (Richards et al. n.d.). Smaller organisms are more susceptible to extremes in temperature and humidity.

If test water is discharged to upland areas, then migrates to other water bodies, water treatment to eradicate known or potentially present NAS likely will be required by state fish and wildlife agency representatives.

If water treatment is necessary, what biocide should be used?

A number of chemicals have been tested to determine efficacy in killing NAS, particularly NZMS, present on recreational equipment, including waders, boats, trailers, etc. These include: Formula 409 Disinfectant, bleach, copper sulfate, and quaternary ammonium salts. Testing

using carbon dioxide, salt, potassium permanganate, hydrogen peroxide, and various commercially-formulated biocides (GreenClean Pro) has been conducted. In addition, tetrakishydromethylphoshonium sulphate (THPS) has been used as a biocide in marine pipeline settings. Many of these chemicals are effective, but are not likely feasible for water treatment because they kill non-target species or result in generation of waste water that requires post-use treatment (see Attachment 3).

One promising biocide appears to be algaecide/bactericide GreenClean Pro and/or GreenClean Liquid, manufactured by BioSafe Systems LLC. The active ingredient(s) are peroxyacetic acid (a weak acid) and hydrogen dioxide/sodium carbonate peroxyhydrate (forms of peroxide). These ingredients form hydroxyl free radicals that destroy cell membranes on contact. The chemicals are manufactured for use in ponds, agricultural irrigation systems, stock tanks, livestock watering systems, and other settings where water use is sensitive and sensitive fish and other animal species are present. One laboratory test using GreenClean Pro suggests efficacy in killing NZMS (Garretson 2005).

Benefits include:

- Non-toxic to sensitive fish and plants
- Non-bioaccumulative (biodegrades completely)
- Certified for drinking water
- Reacts immediately (within 60 seconds of application)
- Available in granular or liquid form; liquid form likely could be injected directly into the pipeline
- Preliminary testing and anecdotal information strongly suggest effective in treating NZMS and zebra mussels
- On soil, 99% degradation within 20 minutes
- By-products are water and oxygen, which do not require post-use treatment

Drawbacks include:

- Not labeled for use as molluscide; NAS-kills considered a “secondary” benefit of product use
- Additional laboratory and/or field testing recommended to determine appropriate dosing concentration and rate
- Hydroxyl radicals may react with coatings inside pipeline

Other considerations:

- Determine if injected liquid can be adequately mixed throughout pipeline test segment
- Account for production of oxygen and carbon dioxide as by-product (increased gas pressure in pipeline)
- Consider legality of use of product at application rates that may differ from manufacturer-recommended rates

Are there alternatives to use of a biocide to eliminate NAS in test water?

As noted above, freezing and drying are effective means of killing NAS such as the NZMS (NZMS Management and Control Plan Working Group 2006, Richards et al. unpublished). Timing of hydrostatic testing to occur during colder, late spring months when NAS populations are low and test water can be discharged under near-freezing conditions may obviate the need for water treatment with a biocide.

In addition, water treatment with carbon dioxide (carbonation) followed by pressurization has proven effective in treating large volumes of water containing NZMS at fish hatcheries (Heimowicz. 2009) and in ballast waters released to the Great Lakes and Hudson River (Moffitt 2009). It is thought that the combination of the creation of carbonic acid and the elimination of oxygen in the water following treatment with carbon dioxide and pressurization resulted in death of the NZMS. Use of carbon dioxide may be particularly applicable to hydrostatic test water treatment as carbon dioxide is inexpensive and pressurization is already part of the pipeline testing protocol.

References

Garretson, Sean. 2005. An Examination of New Zealand Mudsnail (*Potamopyrgus antipodarum*) Mortality in Association with Greenclean® Pro Algaecide Application. Draft. Portland State University. Department of Environmental Sciences and Resources. Center for Lakes and Reservoirs.

Heimowicz, Paul. 2009. Telephone conversation between Alma Feldpausch, Ecology and Environemtn, Inc., and P. Heimowicz, U.S. Fish and Wildlife Service, on May 7, 2009 regarding water treatment methods for New Zealand mud snail.

Hylleberg J. and H.R. Siegismund. 1987. Niche Overlap in Mud Snails (Hydrobiidae): Freezing Tolerance. Marine Biology. 94:403-407.

Moffitt, Christine. 2009. Telephone conversation between Alma Feldpausch, Ecology and Environment, Inc., and C. Moffitt, U.S. Geological Survey and University of Idaho, on May 20, 2009 regarding treatment of large water volumes with carbon dioxide to eradicate exotic mussels.

New Zealand Mud Snail Management and Control Plan Working Group. 2006. National Management and Control Plan for the New Zealand Mudsnail (*Potamopyrgus antipodarum*), Draft. Prepared for the Aquatic Nuisance Species Task Force.

Richards, David C., Pat O'Connell, and Dianne Cazier Shinn. No date. Simple Control Method to Limit Spread of New Zealand Mudsnail, *Potamopyrgus antipodarum*.

Siegsmund H.R. and J. Hylleberg. 1987. Dispersal-Mediated Coexistence of Mud Snails (Hydrobiidae) in an Estuary. Marine Biology. 94:395-402.

U.S. Geological Survey. 2004. Non-indigenous Aquatic Species Database. Gainsville, Florida. http://www.usgs.gov/ accessed during Spring 2009 and January 22, 2010.

Attachment 1:
Database Search on Non-Indigenous Aquatic Species in Surface Water Bodies Located in the Vicinity of Ruby Pipeline Hydrostatic Test Water Source Locations

Hydrostatic test water will be obtained from groundwater sources at most locations along the pipeline. When groundwater is not available, surface water sources will be used to supply water for testing. Surface water bodies from which hydrostatic test water is likely to be obtained include the following:

Ham's Fork River, Lincoln County, Wyoming
Mantua Reservoir, Box Elder County, Utah
Bear River (east), Rich County, Utah
Woodruff Creek, Rich County, Utah
Bear River, South Fork, Cache County, Utah

This list of water bodies may change, depending on availability of groundwater sources.

To determine if surface water used in hydrostatic testing contains NAS, a literature and online database search was conducted. The primary database accessed to obtain listings of NAS is the USGS NAS Database, accessible at: http://nas.er.usgs.gov/. The USGS NAS database is a central repository for georeferenced reports of NAS, and includes species intentionally and unintentionally introduced to water bodies throughout the United States.

To ensure a comprehensive search, all water bodies within the same HUC-8 as the source water bodies listed above were included in the search. The presence of NAS in HUC-8 water bodies listed the attached Table 1-1 may or may not be an indication of their presence in hydrostatic treatment water sources located within the same HUC-8 region. Further investigation and inquiry among groups and individuals familiar with the specific surface water sources must be conducted to confirm the presence or absence of NAS.

Of the surface water sources listed above, only the Ham's Fork River, Mantua Reservoir, and Bear River are reported to have NAS in the USGS NAS database. It is not known if the NAS are present at the point of test water uptake. Once the presence of NAS in surface water sources is confirmed, target NAS must be identified in consultation with state resource and water quality agencies as some NAS may or may not be of concern.

Based on this preliminary database search, no exotic NAS are reported as present in the Ham's Fork River, Mantua Reservoir, and Bear River.

Other sources reviewed to obtain information on NAS in test water sources include:

National Watershed Network – Know Your Watershed: http://www2.ctic.purdue.edu/cgi-bin/ShowWatershed.exe?Watershed=Little+Bear+River+(USGS%23%3A+16010203)

EPA Surf Your Watershed: http://cfpub.epa.gov/surf/huc.cfm?huc_code=

Trout Unlimited: http://www.tu.org/site/c.kkLRJ7MSKtH/b.3022897/k.BF82/Home.htm

USDA National Invasive Species Information Center: http://www.invasivespeciesinfo.gov/

University of Wyoming Cooperative Extension Service: http://uwadmnweb.uwyo.edu/LincolnCES/

Center for Invasive Species and Ecosystem Health: http://www.invasive.org/state.cfm?id=us_wy

Protect Your Waters Action Team (USFWS and USCG): http://www.protectyourwaters.net/

Utah Division of Wildlife Resources Aquatic Nuisance Species: http://wildlife.utah.gov/habitat/ans/

Wyoming Department of Fish and Game Aquatic Invasive Species: http://gf.state.wy.us/fish/AIS/index.asp

Nevada Department of Wildlife: http://www.ndow.org/fish/exotic/

Oregon Department of Fish and Wildlife: http://www.dfw.state.or.us/conservationstrategy/invasive_species.asp

USFWS Aquatic Nuisance Species Home and Invasive Species Home: http://www.fws.gov/contaminants/ANS/ANSSpecies.cfm, http://www.fws.gov/invasives/index.html

100th Meridian Initiative: http://100thmeridian.org/

Attachment 2:
Agency Contact Reports and Correspondence

The following is a summary of agency contact reports and correspondence to confirm the presence or absence of NAS in hydrostatic test water sources. NAS are also considered to be invasive species unless otherwise indicated. Surface water bodies investigated include:

Ham's Fork River (MP 0.98), Lincoln County WY
Bear River (east) (MP 52.88), Rich County UT
Woodruff Creek (MP 60.82), Rich County UT
Porcupine Canal (MP 92.06), Cache County UT
Bear River South Fork (MP 94.87), Cache County UT
Mantua Reservoir (MP 101.38), Box Elder County UT

Wyoming

Ham's Fork River was investigated for the presence or absence of NAS. Robert Keith, Wyoming Fish and Game, indicated that if transported white suckers in Ham's Fork River could hybridize with native populations in other watersheds. Robert Keith also advocated that NAS are typically present for a time period before detection; therefore there is an "assumption of presence" for New Zealand Mud Snail (NZMS) and other NAS in these waterbodies (not included in table 2-1). Additionally John Henderson, BLM fisheries biologist, stipulated that test water should not be transferred to different water bodies or basins, discharged to upland locations, and section 7 consultations will be required due to water depletion from the Colorado River System.

Robert Keith provided the list of NAS and John Henderson provided non-native game species in Roberson Creek; John Henderson also confirmed that Robert Keith has the most complete records of NAS in Wyoming waterbodies (Contact Report: Keith 7-10-2009, E-mail: Keith 7-10-2009 and Henderson 8-31-2009). NAS for Roberson Creek are suspected present due to presence in the source water, Hams Fork River. Robert Keith provided (and Clark McCreedy, USFWS, confirmed) the list of NAS in Ham's Fork River (Table 2-1) (Contact Report: Keith 4-9-2009 and McCreedy 4-13-09).

Utah

Bear River (east), Woodruff Creek, Porcupine Canal, Bear River South Fork, and Mantua Reservoir were investigated for the presence or absence of NAS. The Utah Division of Wildlife Resources (UDWR) indicated that Phragmites (a common reed), Eurasian water milfoil, and purple loosestrife are associated with waterfowl marshes (E-mail: Kramer 4-28-09); screening intake should catch most aquatic plants (Contact Report: Hutchinson 4-15-2006). To prevent the spread of known and unknown NAS decontamination procedures are recommended as well

as the prohibition of untreated water being discharged in new watersheds (Contact Report: Kramer 8-10-2009, E-mail: Hutchinson 8-3-2009 and 8-16-2009).

Craig Schaugaard, UDWR, indicated that Porcupine Canal is not monitored by the UDWR, and there is a lack of non-indigenous invertebrate and plant data for all waterbodies (E-mail: Schaugaard 4-28-09). Craig Schaugaard provided the list of NAS in Bear River (east), Woodruff Creek, and Porcupine Canal in coordination with Pam Kramer, UDWR (Table 2-1) (E-mail: Schaugaard 4-28-09). Candace Hutchinson, UDWR, provided that there are no documented NAS in Bear River South Fork (E-mail: Hutchinson 8-17-2009), and Pam Kramer provided the list of NAS in Mantua Reservoir (E-mail: Kramer 2-5-2010).

Waterbody	Suspected NAS	Known NAS
Ham's Fork River (MP 0.98) Lincoln County WY		common carp- *Cyprinus carpio* fathead minnow- *Pimephales promelas* longnose dace- *Rhinichthys cataractae* redside shiner- *Richardsonius balteatus* Utah chub- *Gila atraria* white sucker-*Catostomus commersoni* burbot-*Lota lota* (freshwater cod)
Bear River (east) (MP 52.88) Rich County UT		Brown trout Rainbow trout Common Carp
Woodruff Creek (MP 60.82) Rich County UT		Brown trout
Porcupine Canal (MP 92.06) Cache County UT	Brown trout Rainbow trout	
Bear River South Fork (MP 94.87) Cache County UT		No NAS documented
Mantua Reservoir (MP 101.38) Box Elder County UT		Eurasian Water milfoil

Attachment 3:
Summary of Biocides for Treatment of Non-Indigenous Aquatic Species in Hydrostatic Test Water

Documented NAS in hydrostatic test water sources include primarily domestic species that can be screened out of test water. However, one documented exotic species, the NZMS, cannot be effectively screened. To prevent NZMS present in test water from infecting waters at discharge point locations, test water may be treated with biocides. The following list of chemicals have been used or tested for treatment of NZMS-infected water or equipment. Pros and cons for each chemical are provided.

GreenClean Pro

Pros:

- Non-toxic to sensitive fish and plants
- Non-bioaccumulative (biodegrades completely)
- Certified for drinking water
- Reacts immediately (within 60 seconds of application)
- Available in granular or liquid form; liquid form likely could be injected directly into the pipeline
- Preliminary testing and anecdotal information strongly suggest effective in treating NZMS and zebra mussels
- On soil, 99% degradation within 20 minutes
- By-products are water and oxygen; do not require pre-disposal treatment

Cons:

- Not labeled for use as molluscide; NAS-kills considered a “secondary” benefit of product use
- Additional laboratory and/or field testing recommended to determine appropriate dosing concentration
- Hydroxyl radicals may react with coatings inside pipeline

Carbon Dioxide

Pros:

- Inexpensive, readily available
- Tested successfully on larger scale by USGS staff to treat ballast water in ships (Great Lakes, Hudson River)
- Requires pressurization during treatment, which is part of pipeline hydrostatic test protocol

Cons:

- Not tested in a pipeline setting, but it is likely existing methods can be up-scaled to pipeline under consultation with USGS staff to ensure adequate partial pressures achieved to kill NZMS, zebra mussels, other exotic NAS
- Safety and logistical considerations for transport of pressurized gas to pipeline manifold locations

Formula 409 Disinfectant

Pros:

- Recommended for use in killing NZMS on fishing gear by federal and state organizations/agencies

Cons:

- Test water may require pre-disposal treatment
- No test results available for use in water treatment

Bleach

Pros:

- Shown to kill NZMS present on fishing gear
- Used by ProAct Services Corporation to disinfect treatment water for zebra mussels on Marathon Pipeline running from Kentucky to Illinois. Treated water with bleach to be consistent with chlorine concentration in drinking water. Not known if water tested before and after to confirm efficacy of use (personal communication with Peter Horrall, 210-862-6467, ProAct Services Corporation).

Cons:

- Requires aeration or other post-use treatment prior to disposal
- Inconsistent efficacy in killing NZMS; not universally recommended by NZMS task force

Copper sulfate

Pros:

- Recommended for use in killing NZMS on fishing gear by federal and state organizations/agencies

Cons:

- Highly toxic to fish, aquatic invertebrates, and plants
- Generally not recommended for use in water bodies
- Toxic to upland invertebrates, including bees, earthworms, other beneficial organisms
- Strongly bioaccumulates
- Test water requires post-use treatment prior to disposal, cannot be discharged to upland soils

Quaternary ammonium salts (benzethonium chloride, Sparquat 256, Bayluscide/niclosamide, others)

Pros:

- Recommended for use in killing NZMS on fishing gear by federal and state organizations/agencies

Cons:

- No test results available for use in water treatment
- Test water requires post-use treatment prior to disposal, cannot be discharged to upland soils
- Toxic to aquatic life
- Does not biodegrade

Salt (magnesium chloride / potassium chloride)

Pros:

- NZMS and other NAS intolerant of high salinity

Cons:

- Likely harmful to upland and aquatic environments, depending on concentration
- Test water requires post-use treatment prior to disposal
- Effective concentration at saturation, likely not practical to implement

Potassium permanganate

Pros:

- Shown to be effective by Utah Division of Wildlife Resources when used at high concentrations
- Test water does not require treatment post-use

Cons:

- Regulated by U.S. Drug Enforcement Agency (need to confirm)
- No test results available for use in water treatment
- Only somewhat effective in killing NZMS on fishing gear in tests by California Department of Fish and Game

Hydrogen peroxide

Pros:

- Found to be effective at killing NZMS on fishing gear

Cons:

- No test results available for use in water treatment
- Requires high concentrations
- May react with coatings inside pipeline

THPS

Pros:

- Used as a biocide in off-shore pipeline hydrostatic testing in ecologically-sensitive waters (target = sulfur-reducing bacteria)
- Degradable (hydrolyses within 7 days)
- Does not bioaccumulate

Cons:

- Typically used in marine environments, need additional review for upland and freshwater environment impacts
- A proportion of THPS adsorbs to pipeline
- Not known if effective in killing NZMS

Other chemicals tested but not recommended for use due to inefficacy and/or damage to fishing/wading gear (CaDFG 2005): Grapefruit seed extract, isopropanol, Pine Sol, ammonia.

Source: California Department of Fish and Game. 2005. Controlling the spread of New Zealand mud snails on wading gear. Administrative Report 2005-02. Office of Spill Prevention and Response. May 16, 2005.

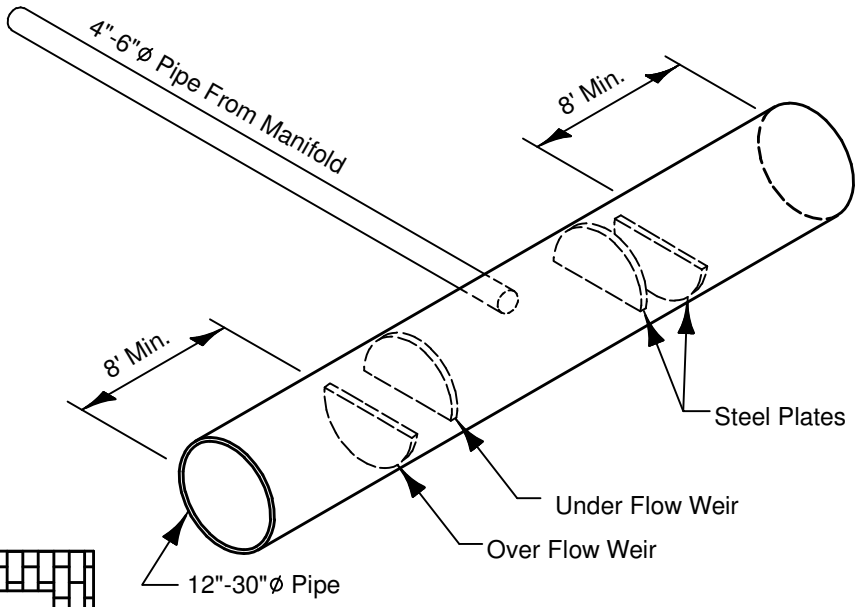
Table 1-1. Nonindigenous Aquatic Species Reported in the Vicinity of Ruby Pipeline Test Water Sources (USGS NAS Database search results)

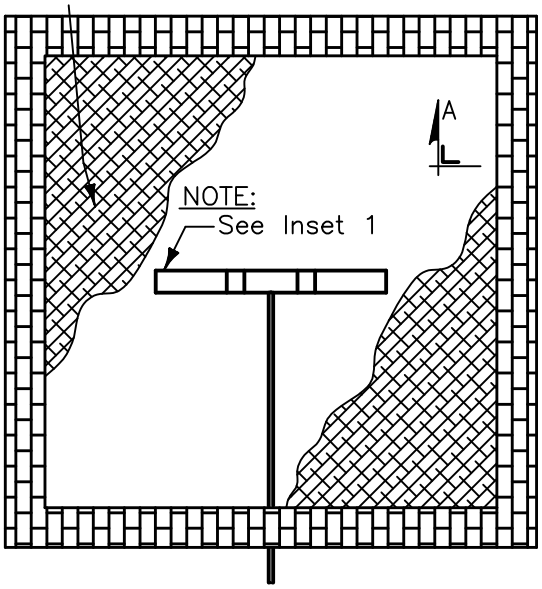
State	County	Locality	Year	HUC-4	HUC-8	Drainage Name	Status	Group	Family	Scientific Name	Common Name	Native Habitat	Exotic/Native Transplant
ID	?	Caribou National Forest	2001	1601	16010204	Lower Bear-Malad	Established	Fishes	Centrarchidae	Micropterus salmoides	largemouth bass	Freshwater	Native Transplant
ID	?	Caribou National Forest	2001	1601	16010204	Lower Bear-Malad	Established	Fishes	Salmonidae	Oncorhynchus mykiss	rainbow trout	Freshwater-Marine	Native Transplant
ID	Oneida	Daniels Reservoir	2000	1601	16010204	Lower Bear-Malad	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater	Exotic
ID	Oneida	Little Malad River, lead branch	2000	1601	16010204	Lower Bear-Malad	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater	Exotic
UT	?	Bear drainage, Bear River	1963; 1998	1601	16010101	Upper Bear Creek	Collected; Established	Fishes	Percidae	Sander vitreus	walleye	Freshwater	Native Transplant
UT	?	Bear River	1896	1601	16010101	Upper Bear Creek	Failed	Fishes	Centrarchidae	Ambloplites rupestris	rock bass	Freshwater	Native Transplant
UT	?	Bear River	1897	1601	16010101	Upper Bear Creek	Established	Fishes	Centrarchidae	Micropterus salmoides	largemouth bass	Freshwater	Native Transplant
UT	?	Bear River	1987	1601	16010101	Upper Bear Creek	Established	Fishes	Centrarchidae	Pomoxis nigromaculatus	black crappie	Freshwater	Native Transplant
UT	?	Bear River	1963	1601	16010101	Upper Bear Creek	Collected	Fishes	Ictaluridae	Ameiurus melas	black bullhead	Freshwater	Native Transplant
UT	?	Bear River	1963	1601	16010101	Upper Bear Creek	Established	Fishes	Ictaluridae	Ictalurus punctatus	channel catfish	Freshwater	Native Transplant
UT	Rich	Bear River at Cache Junction	1882	1601	16010101	Upper Bear Creek	Failed	Fishes	Clupeidae	Alosa sapidissima	American shad	Freshwater-Marine	Native Transplant
UT	Rich	Woodruff Reservoir	1996	1601	16010101	Upper Bear Creek	Stocked	Fishes	Salmonidae	Salmo x Salvelinus trutta x fontinalis	tiger trout	Freshwater	Exotic Hybrid
UT	Cache	Clarkston Creek at Utah 142	2002	1601	16010102	Middle Bear	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	Cache	Cutler Reservoir	1963	1601	16010102	Middle Bear	Collected	Fishes	Centrarchidae	Archoplites interruptus	Sacramento perch	Freshwater	Native Transplant
UT	Rich	Bear Lake	1897	1601	16010201	Bear Lake	Established	Fishes	Centrarchidae	Micropterus salmoides	largemouth bass	Freshwater	Native Transplant
UT	Rich	Bear Lake	1896	1601	16010201	Bear Lake	Failed	Fishes	Clupeidae	Alosa sapidissima	American shad	Freshwater-Marine	Native Transplant
UT	Rich	Bear Lake	1959	1601	16010201	Bear Lake	Established	Fishes	Salmonidae	Oncorhynchus mykiss kamloops strain	Kamloops trout	Freshwater-Marine	Native Transplant
UT	Rich	Bear Lake	1923; 1963	1601	16010201	Bear Lake	Established; collected	Fishes	Salmonidae	Oncorhynchus nerka	kokanee, sockeye	Freshwater-Marine	Native Transplant
UT	Rich	Bear Lake	1963; 1987	1601	16010201	Bear Lake	Stocked; established	Fishes	Salmonidae	Salvelinus namaycush	lake trout	Freshwater	Native Transplant
UT	Cache	Hyrum Reservoir	1952	1601	16010203	Little Bear-Logan	Collected	Fishes	Percidae	Sander vitreus	walleye	Freshwater	Native Transplant
UT	Cache	Hyrum Reservoir	2000	1601	16010203	Little Bear-Logan	Established	Fishes	Centrarchidae	Lepomis macrochirus	bluegill	Freshwater	Native Transplant
UT	Cache	Hyrum Reservoir	2000	1601	16010203	Little Bear-Logan	Established	Fishes	Percidae	Perca flavescens	yellow perch	Freshwater	Native Transplant

Table 1-1. Nonindigenous Aquatic Species Reported in the Vicinity of Ruby Pipeline Test Water Sources (USGS NAS Database search results)													
State	**County**	**Locality**	**Year**	**HUC-4**	**HUC-8**	**Drainage Name**	**Status**	**Group**	**Family**	**Scientific Name**	**Common Name**	**Native Habitat**	**Exotic/Native Transplant**
UT	Cache	Hyrum Reservoir	2000	1601	16010203	Little Bear-Logan	Stocked	Fishes	Salmonidae	Oncorhynchus mykiss	rainbow trout	Freshwater	Native Transplant
UT	Cache	Little Bear River at Avon	2002	1601	16010203	Little Bear-Logan	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	?	Little Bear River in Cache Valley in northern UT	1987	1601	16010203	Little Bear-Logan	Established	Fishes	Centrarchidae	Micropterus punctulatus	spotted bass	Freshwater	Native Transplant
UT	Cache	Little Bear River, west of Avon	2001	1601	16010203	Little Bear-Logan	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	Cache	Logan	1988	1601	16010203	Little Bear-Logan	Established	Plants	Lythraceae	Lythrum salicaria	Purple loosestrife	Freshwater	Exotic
UT	Cache	Logan Creek	2000	1601	16010203	Little Bear-Logan	Established	Fishes	Salmonidae	Salvelinus fontinalis	brook trout	Freshwater	Freshwater
UT	Cache	Logan River	1987	1601	16010203	Little Bear-Logan	Established	Fishes	Centrarchidae	Pomoxis nigromaculatus	black crappie	Freshwater	Native Transplant
UT	Cache	Logan River	1963	1601	16010203	Little Bear-Logan	Collected	Fishes	Ictaluridae	Ameiurus melas	black bullhead	Freshwater	Native Transplant
UT	Cache	Logan River	1987	1601	16010203	Little Bear-Logan	Established	Fishes	Salmonidae	Salmo trutta	brown trout	Freshwater-Marine	Exotic
UT	Cache	Logan River in ponds near 3rd dam (just NE of Logan)	2002	1601	16010203	Little Bear-Logan	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	Cache	Springs, ponds, streams near Willow Valley Sportsmans Club (Little Bear region near Paradise)	2002	1601	16010203	Little Bear-Logan	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	Box Elder	Bear River, west of Collinston	2000	1601	16010204	Lower Bear-Malad	Established	Fishes	Ictaluridae	Ictalurus punctatus	channel catfish	Freshwater	Native Transplant
UT	Box Elder	Bear River, west of Collinston	2000	1601	16010204	Lower Bear-Malad	Established	Fishes	Percidae	Sander vitreus	walleye	Freshwater	Native Transplant
UT	?	Caribou National Forest	2001	1601	16010204	Lower Bear-Malad	Established?	Fishes	Salmonidae	Salmo trutta	brown trout	Freshwater-Marine	Exotic
UT	?	Caribou National Forest	2001	1601	16010204	Lower Bear-Malad	Established	Fishes	Salmonidae	Salvelinus fontinalis	brook trout	Freshwater	Native Transplant
UT	?	Lower Bear-Malad drainage; Box Elder	1980; 1987	1601	16010204	Lower Bear-Malad	Established	Fishes	Centrarchidae	Pomoxis nigromaculatus	black crappie	Freshwater	Native Transplant
UT	Box Elder	Mantua Reservoir	2000	1601	16010204	Lower Bear-Malad	Established	Fishes	Centrarchidae	Lepomis macrochirus	bluegill	Freshwater	Native Transplant
UT	Box Elder	Lucin Spring Road	2007	1602	16020308	Northern Great Salt Lake Desert	Established	Mollusks-Gastropods	Hydrobiidae	Potamopyrgus antipodarum	New Zealand mudsnail	Freshwater-Brackish	Exotic
UT	Box Elder	Bear River Bird Refuge in Bear River Bay of Great Salt Lake; Willard Bay Reservoir	1956; 1987; 1998	1602	16020310	Great Salt Lake	Collected; Established	Fishes	Percidae	Sander vitreus	walleye	Freshwater	Native Transplant
UT	?	Great Salt Lake	1874	1602	16020310	Great Salt Lake	Failed	Crustaceans-Lobsters	Nephropidae	Homarus americanus	American lobster	Marine	Native Transplant
UT	?	Great Salt Lake	1873	1602	16020310	Great Salt Lake	Failed	Fishes	Clupeidae	Alosa sapidissima	American shad	Freshwater-Marine	Native Transplant

Table 1-1. Nonindigenous Aquatic Species Reported in the Vicinity of Ruby Pipeline Test Water Sources (USGS NAS Database search results)													
State	**County**	**Locality**	**Year**	**HUC-4**	**HUC-8**	**Drainage Name**	**Status**	**Group**	**Family**	**Scientific Name**	**Common Name**	**Native Habitat**	**Exotic/Native Transplant**
UT	?	Great Salt Lake	1980	1602	16020310	Great Salt Lake	Established	Fishes	Fundulidae	Lucania parva	rainwater killifish	Freshwater	Native Transplant
UT	?	Great Salt Lake	1980	1602	16020310	Great Salt Lake	Established	Fishes	Poeciliidae	Gambusia affinis	western mosquitofish	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1999	1602	16020310	Great Salt Lake	Collected	Crustaceans-Cladocerans	Daphnidae	Daphnia lumholtzi	water flea	Freshwater	Exotic
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Catostomidae	Catostomus commersonii	white sucker	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1990	1602	16020310	Great Salt Lake	Established	Fishes	Clupeidae	Dorosoma cepedianum	gizzard shad	Freshwater-Marine	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Luxilus cornutus	common shiner	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Nocomis biguttatus	hornyhead chub	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983; 1996	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Notropis atherinoides	emerald shiner	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Notropis hudsonius	spottail shiner	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Notropis stramineus	sand shiner	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Failed	Fishes	Cyprinidae	Pimephales notatus	bluntnose minnow	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983	1602	16020310	Great Salt Lake	Failed	Fishes	Cyprinidae	Rhinichthys atratulus	blacknose dace	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983	1602	16020310	Great Salt Lake	Established	Fishes	Cyprinidae	Semotilus atromaculatus	creek chub	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983	1602	16020310	Great Salt Lake	Established	Fishes	Gasterosteidae	Culaea inconstans	brook stickleback	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Established	Fishes	Ictaluridae	Ameiurus melas	black bullhead	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1987	1602	16020310	Great Salt Lake	Failed	Fishes	Osmeridae	Hypomesus transpacificus	delta smelt	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983	1602	16020310	Great Salt Lake	Established	Fishes	Percidae	Percina caprodes	logperch	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir	1983	1602	16020310	Great Salt Lake	Established	Fishes	Percopsidae	Percopsis omiscomaycus	trout-perch	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir (just north of Ogden)	1987	1602	16020310	Great Salt Lake	Established	Fishes	Centrarchidae	Pomoxis nigromaculatus	black crappie	Freshwater	Native Transplant
UT	Box Elder	Willard Bay Reservoir (just north of Ogden)	2007	1602	16020310	Great Salt Lake	Established	Mollusks-Bivalves	Corbiculidae	Corbicula fluminea	Asian clam	Freshwater	Exotic
WY	Lincoln	Hams Fork Creek, Green River Drainage	1970	1404	14040107	Blacks Fork	Collected	Fishes	Cyprinidae	Rhinichthys cataractae	longnose dace	Freshwater	Native Transplant
WY	Lincoln	Viva Naughton Reservoir on the Green River	1965	1404	14040107	Blacks Fork	Failed	Fishes	Salmonidae	Salmo letnica	Ohrid trout	Freshwater	Exotic

Attachment D Plan-18 Typical Energy Dissipator





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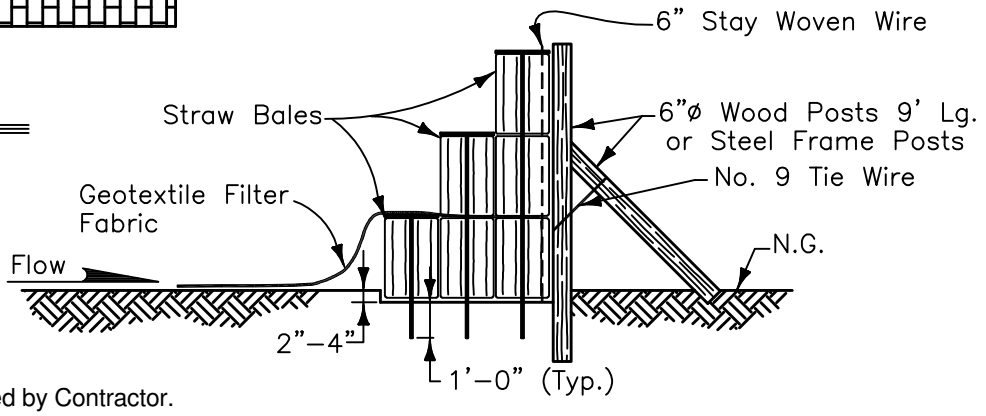
Scale: NONE



SECTION "A–A"
Scale: NONE

NOTE

1. Energy Dissipator to be anchored by Contractor.
2. Typical Energy Dissipator must be used in conjunction w/filter (AS APPROPRIATE)
3. Must be located in an upland area.
4. Sediment must be removed when accumulations reach 1/2 the height of the filters.

NO	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

ENG. RECORD		DATE
DRAWN BY:		
DRAWING APPROVAL		
PROJECT APPROVAL		
SURVEY DATE:		
SCALE: NONE		
PROJECT ID:		
FILE NAME:		

RUBY PIPELINE LLC

TYPICAL ENERGY DISSIPATOR

DWG. NO. PLAN–18

ANRLETTERPORTRAIT (Rev. 2/01)

FERC FILING VERSION 1/23/09